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## Workers' Compensation Insurer Risk Control Systems: Opportunities for Public Health Collaborations

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### Abstract

**Introduction:** Workers' compensation (WC) insurers offer services and programs for prospective client selection and insured client risk control (RC) purposes. Toward these aims, insurers collect employer data that may include information on types of hazards present in the workplace, safety and health programs and controls in place to prevent injury/illness, and return-to-work programs to reduce injury/illness severity. Despite the potential impact of RC systems on workplace safety and health and the use of RC data in guiding prevention efforts, few research studies on the types of RC services provided to employers or the RC data collected have been published in the peer-reviewed literature.

**Methods:** Researchers conducted voluntary interviews with nine private and state-fund WC insurers to collect qualitative information on RC data and systems.

**Results:** Insurers provided information describing their RC data, tools, and practices. Unique practices as well as similarities including those related to RC services, policyholder goals, and databases were identified.

**Conclusions:** Insurers collect and store extensive RC data, which have utility for public health research for improving workplace safety and health.

**Practical applications:** Increased public health understanding of RC data and systems and an identification of key collaboration opportunities between insurers and researchers will facilitate increased use of RC data for public health purposes.

### Keywords

Loss control; workers' compensation insurance; occupational safety and health; databases; return-to-work; exposure assessment

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## Introduction

The workers' compensation (WC) insurer system generates abundant safety and health data through its underwriting, claims, and risk control (RC) functions. Underwriters begin the insurance coverage process, which includes evaluating the risk for injuries associated with current or potential policyholder operations. RC consultants typically employed by the insurer conduct employer site visits to collect necessary underwriting information including data on workplace processes, exposures and controls, and safety and return-to-work (RTW) programs (Collins et al., 2002; Morin et al., 2015; Shockey, Babik, Wurzelbacher, Moore, & Bisesi, 2018). Underwriters use this information and other data sources to guide policyholder selection (to determine which organizations to insure), establish coverage terms including the types and extent of losses that will be covered by the insurance carrier, and premiums (the amount a policyholder pays for insurance). RC consultants also use this information to guide policyholder safety improvement and risk reduction efforts (Collins et al., 2002). When an illness or injury occurs and a policyholder files a claim (an application for insurance benefits) (Utterback, Meyers & Wurzelbacher, 2014), claims adjusters collect information from the policyholder about the nature of and events related to the injury/illness. This enables a determination of whether the insurance policy covers the loss and, if so, the amount of compensation due to the policyholder.

Claims administration produces extensive information on work-related medical conditions, treatments, and costs, with a focus on injuries. The RC process generates substantial employer information including data on safety programs and interventions. Researchers are increasingly using this information along with claims data for surveillance and occupational injury and illness prevention studies (Hogg-Johnson, et al., 2012; Liberty Mutual Research Institute for Safety, 2016; Schofield, Alexander, Berberich, & MacLehose, 2017). Notable long-term partnerships between insurers and public health researchers have advanced occupational safety and health knowledge and practice (Goetzel et al., 2014; Newman et al., 2015; Wurzelbacher et al., 2016). For example, research on the effectiveness of the Ohio Bureau of Workers' Compensation (OHBWC) safety intervention grant (SIG) program indicated that the program reduced claim frequencies and costs (Wurzelbacher et al., 2014). Miller et al. (2017) estimated that the program saved multiple millions of dollars in avoided workers' compensation costs and uncompensated wage losses annually, and contributed to increases in productivity.

While insurer-public health collaborations have used claims and safety and health program information, RC exposure information for research purposes may be underutilized. The importance of RC data within the insurance industry is clear, as insurers use the information to achieve or increase underwriting profit through improved insured client selection and pricing accuracy while reducing the risk for claims and associated expenses. Although its potential for public health purposes has been noted (Morin et al., 2015; National Institute for Occupational Safety and Health (NIOSH), 2010; Utterback et al., 2014), RC data are likely underutilized both within and outside the insurance industry. For example, insurers and public health researchers could use RC data for identifying emerging risks not reflected in claims, and for understanding the distribution of hazards within and across industries. An understanding of risks and their early detection can aid in intervention and injury/illness

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prevention. RC information also can aid in developing evidence-based health and safety controls using data pooled across large samples of employers. Pooled data can assist in identifying trends and patterns that may not be detectable using smaller or more limited data sets. Further, pooling data across multiple insurers may increase generalizability of results and decrease selection bias. Lastly, RC data can be used to identify leading indicators of safety performance, which are measures of exposures or activities that take place prior to the occurrence of and in an effort to prevent injuries or reduce their severity (Morin et al., 2015; NIOSH, 2010). Examples include measures of organizational safety performance (NIOSH, 2010) and RTW programs. In contrast to leading indicators, lagging indicators such as claims and injury rates and costs, which reflect past incidents, traditionally have been used as safety measures (Wurzelbacher & Jin, 2011).

Although the usefulness of RC information has been recognized, until recently minimal research investigating RC data and systems had been published in the peer-reviewed literature. A few recent studies shed light on insurer industrial hygiene (IH) data and their value for public health purposes. Estill (2015) found IH exposure data provided by the OHBWC to be useful for public health research. However, Estill (2015) and Shockey et al. (2018) found that data formats and collection forms were not all standardized, thereby limiting data utility. Further, because data were stored in individual or imaged documents rather than in a centralized database, they were difficult and time-consuming to extract. To facilitate data standardization, Babik, Shockey, Moore, and Wurzelbacher (2018) gathered IH data collection forms from ten organizations, including a combination of five state-based and private insurers. Researchers then convened a panel of IH researchers and practitioners to develop a core set of IH data collection fields based on these forms. Standardized fields are suited for inclusion in WC insurer data collection forms and RC databases. Together these studies provided an initial understanding of IH data collected by insurers, demonstrated insurer interest in standardizing data, and facilitated data standardization by interested insurers and other organizations.

Although there are few research studies on RC data in the peer-reviewed literature, numerous surveys by and for members of the insurance industry have been completed (Al-Tarawneh, Jordan, & Reinerth, 2015; Ward Group, 2016). Several state WC organizations also collect RC information from insurers (Arkansas Workers' Compensation Commission, 2007; Missouri Department of Labor & Industrial Relations, n.d.; Pennsylvania Department of Labor & Industry, 2016; Texas Department of Insurance, 2017). This information is collected for specific purposes, however, and is not available for public health use.

While these previous studies and surveys have advanced the understanding of RC data and processes, a more extensive review of the scope of RC information is needed to address existing knowledge gaps. Consequently, researchers developed the current study. Primary goals included raising awareness of RC data and systems among public health researchers and encouraging its use through increased collaboration between researchers and insurers to improve occupational safety and health. Toward this end, key collaboration opportunities were identified. Additional study aims included identifying questions for use in future quantitative survey-based studies designed to yield data more representative of US

insurers, disseminating common and notable safety and RC practices, and facilitating insurer benchmarking of practices against others' practices and procedures.

## Methods

In 2015 and 2016, WC insurers attending insurance and state-based carrier meetings including those of the American Association of State Compensation Insurance Funds (AASCIF), the Insurance Loss Control Association (ILCA), and Insurance Services Office (ISO) were invited to participate in the study. This study was designed to be a small-scale, qualitative investigation of risk control data and practices with a goal of spurring future research. As such, the number of participants was limited to enable in-depth exploration of interview topics with multiple departments within each insurer. Consequently, participating organizations were not selected to be representative of all US commercial insurers, but to provide qualitative information on practices and tools used by selected RC departments.

Participants engaged in semi-structured interviews and provided RC-related documents including risk assessment forms, organizational charts, department manuals, service guidelines, and RC consultant performance metrics. Interview questions are provided in Appendix A. Between October 2015 and November 2016, phone-based and in-person interviews with RC managers and staff, underwriters, and claims representatives from participating insurers were conducted. Interviews ranged in duration from six hours with RC management to 30 minutes with underwriters and claims representatives. Interview questions focused on RC department practices and system usage, risk assessment forms and collected data, and RTW programs. Interviews with claims and underwriting representatives were held to acquire information on the interaction and collaboration between claims, underwriting, and RC departments in providing insurance coverage and RC service to policyholders. RC department practices, forms, and databases change frequently to accommodate policyholder needs and improve RC service. The following information describes RC practices at the time of the interviews.

## Results

Results are summarized below for aspects most relevant to public health practice. Information more closely related to insurance and RC practices is provided in the online supplemental material. A glossary of insurance terms is provided in Appendix B

### Carrier characteristics:

Four state funds and five private insurers providing monoline WC and multiline policies with regional to national coverage participated in this study. Carriers insured 700 – 127,000 policyholders annually, with three carriers insuring 700 – 1125 policyholders, four insuring 14,000 – 62,500 policyholders, and two insuring 125,000 – 127,000 policyholders. Gross annual premiums ranged from approximately \$123 million to nearly \$3 billion. Totals included premiums from all commercial lines policies. Primary policyholder sectors for participating insurers included agriculture and forestry operations, healthcare and social services, manufacturing, construction, retail, and service industries including dry cleaning, education, restaurants, financial services, and transportation.

The following characteristics describe participating RC departments.

#### **Prospective policyholder surveys:**

In the WC insurance industry, RC consultants conduct prospective policyholder surveys on elements that affect injury risk including job requirements, exposures, and safety practices. Underwriters use this information to make account selection and pricing decisions. Eight of the nine participating insurers used prospective surveys, and within those insurers, underwriters determined survey need. RC consultants conducted surveys most often during site visits and infrequently with phone calls.

#### **Prospective policyholder recommendations:**

Consultants typically discussed improvement recommendations with their site contacts during prospect surveys. This was done to inform them of risks and reduce the likelihood of injuries and to gain and gauge potential compliance with recommendations if coverage were provided. Recommendations were released to companies in writing if they were provided with coverage. In one organization, consultants had the latitude to submit recommendations to prospective accounts regardless of the coverage decision if an immediate risk for injury to employees was observed.

#### **RC-related requirements for coverage and pricing:**

Underwriters considered numerous factors during the coverage and pricing decision-making process. Three carriers had established RC-related criteria for coverage qualification. These criteria typically involved clients demonstrating a commitment to work with the carrier's RC department to improve safety, showing use of a RTW policy, and/or having a formalized list of health care providers. Without these elements, prospective policyholders may not have been considered for WC coverage. The six remaining carriers had no established RC-related requirements for WC coverage. Use of safety and RTW programs, effective hiring practices, and recommendation compliance may have affected pricing or coverage during the policy year, however.

#### **RC service:**

Insurers provided an array of WC-related services to their policyholders, including safety/WC assistance and industrial hygiene services, which all carriers provided, and ergonomics assistance, which all but one carrier provided. RC consultants used policyholder RC and claims information, along with other information, to guide the focus and content of service. Whether focused on IH, ergonomics, or general safety concerns, service typically consisted of onsite testing or risk assessments to identify hazards, root causes, and deficiencies; safety program reviews; safety training; and/or provision of safety guidance.

#### **Service objectives:**

Participants reported providing policyholder service for several reasons. These included reducing hazards, claims, and claims costs, developing relationships and loyalty for account retention, addressing customer-identified needs, assisting with safety management improvement, collecting information for underwriters for policy renewal, validating class

codes (which classify categories of work being performed by the policyholder), and assisting with Occupational Safety and Health Administration (OSHA) compliance. Consultants in some organizations also collected information for claims adjusters who used the information to determine claim compensability for particular cases.

#### **Post-visit communication and recommendations:**

Following site visits, most carriers required written communication from consultants to policyholders. This communication served to document visit activities, accomplishments, WC claim losses and loss trend information, workplace exposures, and recommendations for risk reduction. Consultants also submitted recommendations to policyholders on exposures or programs that required improvement. Eight carriers had developed libraries of standardized recommendations for consultant use. The largest library contained more than 550 recommendations, with the expectation that consultants use them rather than develop their own. Consultants in the remaining organizations had the option of using standardized recommendations or their own personalized recommendations.

Consultants encouraged policyholder compliance with recommendations in various ways. These included providing return-on-investment information or informing policyholders at policy inception that non-compliance may lead to policy cancellation or non-renewal. One carrier implemented a plan for high-risk employers in which a percentage of premium was returned to policyholders upon compliance with incentive program terms. Additionally, consultants explained that premium reductions with improved experience modification rates could accompany loss reductions, that pricing increases could occur in the absence of recommendation compliance, or that RC service could be discontinued if improvements were not made. Lastly, consultants appealed to the goals of the policyholder and discussed the benefits of recommendations such as compliance with OSHA regulations, loss reduction, increased profitability, and increased employee safety, productivity, and morale.

#### **Service quantity:**

Insurers used one of three primary models to prioritize and allocate service to policyholders who met established criteria. The model adopted by five insurers was the use of service guidelines to specify the minimum number of onsite visits per year. Visit quantity was typically based on premium level and adjusted according to claims and exposures. At the highest service level, two to three visits (with a range of one to eight visits depending on insurer) were often allotted to policyholders who met designated premium levels, with consultants having discretion to provide additional consultation as warranted by losses. At the lowest level, policyholders may have received no onsite service, service upon request only, or one visit every two to three years depending on insurer. Using a second model, consultants in three insurers had authority to determine and provide appropriate service levels based on losses and risks. One RC consultant visited a single-site policyholder 28 times in one year, which was supported by the insurer and warranted by claims and exposures. Factors that commonly influenced service level for insurers using this model included loss ratio (ratio of premium paid to current year losses), premium level, loss potential, experience modification rate, safety management deficiencies, and requests by policyholders, claims adjusters, and underwriters. Using a third model, underwriters in one

organization determined the need for most policyholder visits. Although no firm criteria were used to determine service need, underwriters typically requested visits to check policyholder attention to and resolution of safety concerns, and for accounts with elevated losses or high premiums.

### **Service strategy and plans:**

Six RC departments used annual service plans to formulate and organize policyholder service. Consultants typically developed plans collaboratively with policyholders and, in some insurers, with input from agents. Plans specified activities, timelines, goals, and people responsible for them including RC consultants and policyholder representatives. Goals included claims reduction and safety improvement, which if achieved not only reduced injuries and associated costs, but also increased policyholder loyalty and retention.

Service plans were developed for policyholders with high premiums, claims, or exposures. Consultants in one RC department also had the latitude to develop customized service plans for smaller accounts. Another insurer provided generic plans to small accounts rather than collaboratively customizing plans as done with large accounts. Policyholders were to implement these plans largely on their own with minimal assistance from consultants. Plans were generic in that they focused on developing safety committees and concerns or needs common to the policyholder's industry. Rather than using service plans, consultants in three departments collaboratively determined their focus with policyholders for the upcoming few months. This shorter-term approach, which was documented in follow-up letters to policyholders, was used in a desire to provide fluid and responsive service.

### **RC database:**

The RC database is a primary tool used by RC departments to store policyholder reports, recommendations, completed forms and templates, and letters. Underwriters access the database to review prospective and current policyholder reports and associated information. During the interview period, a few RC departments were transitioning from databases with limited functionality (e.g., databases that stored documents but did not allow for data mining or tracking of recommendation status) to those with full-functionality built by vendors. After the transitions, six RC departments were using vendor-developed databases designed specifically for RC usage. One department was using a vendor-developed database designed for the WC insurance industry, and two were using in-house systems with moderate to full functionality relative to vendor-built systems.

### **Assessment forms:**

RC management and staff with input from underwriters and/or claims representatives developed nearly all risk assessment templates. The exception was a few questions on one RC department's employer-completed safety assessment form that were excerpted from a validated and publicly available questionnaire. Across carriers, form content was based on various elements including components of safety and health programs, National Council on Compensation Insurance (NCCI) criteria, federal and state OSHA regulations, and policyholder hazards and claims. For data collection, forms contained checkboxes, numerical ratings or alpha grading, and space for narrative.

Four RC departments used a single risk assessment form regardless of policyholder premium, size, sector, or other components. One department used one form for policyholders in an assigned risk plan and a different form for those not in the plan. A different department used one form for small accounts (based on premium) and a longer and wider-ranging form for larger accounts. Three departments tailored assessment forms for use in specific industries (e.g., social services, school districts, and agriculture) or for specific exposures (e.g., fire, forklift use, ergonomics, and ladder safety). RC consultants in one of the organizations had latitude to develop or modify assessment forms according to their individual needs and preferences. Insurer risk assessment forms contained 50 – 150 items, with some overlap in question topics across insurers. Table 2 contains the six most commonly addressed topics, with all nine participating departments covering one specific topic, and eight departments covering the same five topics. Question category labels were adapted from labels used on risk assessment forms. Appendix C contains a list of topics that four or more RC department forms addressed.

In addition to consultant-completed risk assessment forms, one company used an employer-completed assessment form that consultants sent to policyholders prior to initial RC site visits. This provided information to consultants prior to site visits about policyholder safety efforts, and served as a tool to compare policyholder perceptions with RC consultant assessments.

Insurers used RC information for various purposes. RC consultants used it along with WC claims information to identify policyholders' safety-related deficiencies and trends, and guide and benchmark policyholders' safety improvement efforts. RC leadership used RC and claims information to guide the development of safety materials for current and potential policyholders; underwriters used it to validate class codes and assist with risk selection and pricing. Several carriers were beginning to examine the correlation of risk assessment scores with claims frequency, and the effect of RC service on claims. One organization planned to lower premiums with the implementation of recommendations if risk scores correlated with claims, and if service reduced claims. Lastly, RC leadership used account scores to evaluate RC consultants' service, with the expectation that consultants had issued recommendations to, and/or developed account improvement plans for, accounts with elevated risk scores.

### **Policyholder deliverables:**

RC departments provided a range of deliverables to policyholders, most often including post-visit letters and recommendations. Additionally, consultants provided IH reports detailing noise and/or air sampling results, consultant-completed safety assessment forms, and ergonomics reports and office ergonomics assessment forms documenting hazards and suggested controls. Consultants also completed safety committee checklists to provide feedback on committee development and functioning. Lastly, some RC departments developed stewardship reports to document policyholder accomplishments and successes over a specified period, which was typically a policy year. Reports also contained information on account strengths, opportunities for improvement, and claims analyses.

### **Return-to-work assistance:**

Eight of the nine carriers provided policyholders with RTW guidance. In most carrier organizations, claims staff collected information on policyholder use of RTW programs and modified duty jobs and shared it with RC consultants. RC consultants, RTW specialists, and occasionally claims representatives provided policyholders with RTW assistance. Such assistance often involved developing or assisting with implementing RTW programs, identifying and promoting the use of modified duty jobs, and identifying physicians for policyholders' physician panels.

### **Training and informational materials:**

Several RC departments provided safety workshops and/or training to policyholders and non-policyholders based on industry, risks, and claims information. The notion was that training not only advanced understanding of safety and accident prevention, it also raised awareness of carrier and RC service and related benefits for marketing purposes. One carrier's media center developed quarterly newsletters and streaming videos on exposures and risk reduction techniques tailored to their policyholders' industries, exposures, and claims. The materials, which were available to policyholders, provided practical safety-related information while highlighting the carrier's RC service and expertise.

### **Policyholder grants:**

Several insurers developed grant programs that assisted policyholders fund safety improvements. One insurer awarded grants up to \$5,000 for equipment or workplace improvements to policyholders who met specific qualifications. Another carrier awarded qualifying policyholders with matching grants up to \$20,000 to fund approved safety initiatives. Lastly, one carrier awarded grants to regional colleges to fund workplace safety courses for employers, employees, and the public. Grants were also awarded to fire departments in the state to fund certifications, educational classes, and health and wellness programs.

## **Discussion**

WC insurers collect a vast array of RC data, much of which is underutilized for occupational safety and health purposes. However, public health investigators familiar with these data have recently expressed interest in them for occupational injury and illness prevention and control (Utterback et al., 2014). These data may be particularly useful for public health purposes if collected systematically in a standardized format and stored in an accessible form. Potential uses include identifying existing and emerging hazards, assessing the effectiveness of prevention strategies and methods for disseminating safety information including training, and evaluating the effectiveness of health and safety management programs. RC data could also be used to assess leading and lagging indicators (Morin et al., 2015), and exposure assessment methods. Below is a discussion of key opportunities for collaborations between insurers and public health researchers that emerged during the study.

### **Ongoing policyholder service:**

Typically, RC consultants provided service multiple times per year to larger policyholders and those with elevated claims and exposures. RC leaders reported common service goals including minimizing policyholder risks, injuries, and illnesses; addressing customer needs; developing loyalty to increase account retention; and assisting with OSHA compliance. Current policyholder interviews as well as research by Estill (2015), Shockey et al., (2018) and Babik et al., (2018) indicated the prevalence of IH insurer services and the existence of IH data. In fact, all carriers in the current study reported providing IH services to their policyholders. This may be unanticipated in view of Bureau of Labor Statistics reports (2015, 2016) that in 2014 and 2015, approximately 95% of nearly 3 million reported nonfatal occupational injuries and illnesses in US private industry were injuries and 5% were illnesses. While interviews did not differentiate goals by service type, it is speculated that IH services were provided primarily to develop policyholder loyalty, achieve compliance with IH standards, and respond to employee complaints, with claims reductions being a secondary goal. Safety and ergonomics consultation were likely aimed at a wide array of goals including injury frequency and cost reduction. Regardless of service focus, ongoing consultation offers a myriad of opportunities for insurer-researcher partnerships using ergonomics-related, safety, and IH data and services.

### **Policyholder safety requirements and incentives:**

In an effort to minimize the frequency and severity of policyholder claims and related claims costs, some insurer organizations instituted WC coverage requirements that policyholders use a RTW program, implement recommendations directed at high-risk exposures, and/or commit to safety improvement. Carriers also used incentive pricing strategies such as experience modification programs in which policy premiums were increased in response to elevated claims. Other incentive programs were used to influence policyholder safety practices, including a program in which WC premiums were reduced for policyholders who attended safety training and complied with prescribed rules.

Insurer and researcher collaborations could be developed to evaluate and improve upon the effectiveness of incentive and loss reduction programs. Franche et al. (2005), in a review of the effectiveness of RTW interventions, concluded that these interventions can reduce work-related disability duration and associated costs. Dunning et al. (2008), in analyzing claims data provided by the OHBWC, found that transitional work programs reduced the number of lost time claims and indemnity costs. Both groups concluded, however, that additional research is needed to understand the influence of organizational factors, physical job demands, and/or injury type and severity on RTW effectiveness.

Insurer incentive strategies, such as the use of experience rating programs, have also been associated with policyholder injury frequency (Neuhauer, Seabury, & Mendeloff, 2012) and severity (Tompa, McLeod, & Mustard, 2016; Tompa, Trevithick, & McLeod, 2007). However, the intricacies of ratings programs and the mechanisms by which they affect claims require further study. For example, Tompa et al. (2016) found that prospective vs. retrospective experience rating programs differentially affected the magnitude and persistence of claims reductions. The ways in which rating programs, incentive programs,

and RC requirements by insurers affect policyholder safety practices are unclear and present opportunities for further research.

### **RTW programs:**

Whether required by insurers, incentivized through experience ratings programs, or initiated by policyholders themselves, the development and effectiveness of RTW programs could be improved through further research. In a qualitative study, Baril, Clarke, Freisen, Stock, and Cole (2003) found that many factors played a role in the success of RTW programs, including trust, respect, and communication between groups involved in RTW programs, labor-management relations, and the commitment of management to employee safety and health. In a recent literature review, Cullen et al. (2017) noted that while RTW programs and processes have been the focus of extensive research, relatively few high quality intervention studies have been conducted. Overall, findings were mixed for the RTW interventions covered in the review. While some were found to be effective, others were not supported in part because of insufficient evidence. In sum, RC RTW data linked with claims data presents an opportunity to evaluate RTW practices and their effectiveness in reducing the severity of occupational injuries and illnesses.

### **Safety intervention evaluations:**

Partnerships could also evaluate the effectiveness and adoption of safety intervention methods including external safety consultation, grant programs, and engineering and administrative controls. In an example of such collaboration, Wurzelbacher et al. (2014), in partnership with the OHBWC, evaluated the effectiveness of a safety intervention grant program. The program, in which the OHBWC awarded funds to qualifying policyholders to implement health and safety engineering controls, was found to be effective in reducing WC claim rates and costs. Research has also focused on the effectiveness of external safety services on injury rates. Results from a number of studies have suggested that consultation and inspection visits from external safety consultants can be effective (Foley, Fan, Rauser, & Silverstein, 2012; Nave & Veltri, 2004; Schofield et al., 2017), while results of other studies have been mixed (Hogg-Johnson et al., 2012). Although evidence for the effectiveness of safety interventions may exist, practitioners may not adopt them. This points to a need to understand barriers and facilitators to safety measure implementation (Rothmore, Karnon, & Aylward, 2013; Whysall, Haslam, & Haslam, 2004). Improved understanding may enable researchers to develop strategies to close the divide (Chung & Shorrock, 2011), thereby improving implementation and as a result, workplace safety and health. Partnerships with insurers offer a potential way to evaluate such intervention adoption.

### **Safety information dissemination:**

Ongoing policyholder service also provides an opportunity to evaluate methods for conveying safety and health information including training. Training, recognized as a primary element of safety and health programs (NIOSH, 2017; OSHA, 2016), was provided and/or recommended by participating RC departments as a means to reduce injuries and risk. While training is commonly used to increase workplace safety, research on its effectiveness has produced mixed results. Reviews have indicated an overall positive effect of training on attitudes, knowledge, and behaviors (Burke et al., 2006; Cohen & Colligan,

1998; Robson et al., 2012), yet effects of training on health outcomes vary. In conducting a literature review, Robson et al. (2012) concluded that the effects of training on health outcomes “were too small (and inconsistent in their direction) to be considered effective.” In their review, Cohen and Colligan (1998) concluded that although positive effects of training on health outcomes were found in several studies, reductions in injury rates and other outcomes could not be solely attributed to training. In light of such results, additional research and partnerships are needed to evaluate training effectiveness. In addition to using training to disseminate safety information, RC departments also made videos and written materials available to their policyholders. Despite widespread use, the effectiveness of these methods and the factors that increase or lessen the transfer and application of safety information are not well-known (Schulte et al., 2003). Additional research in this area is needed to facilitate prevention efforts.

#### **RC data standardization and pooling:**

Across carriers, some overlap in survey topics was observed. Despite this similarity, survey questions, response categories, and coding differed across insurers, which prevented data pooling. Further, some carriers reported using storage practices that prevented efficient data retrieval. Shockley et al. (2018) reported similar findings from a WC insurer survey. Without the use of accessible, mineable databases, time-consuming extraction from individual reports is required to assemble data for analysis (Estill, 2015). Standardization of a core set of ergonomics and general safety questions, such as those developed by Babik et al. (2018) for IH data collection, and standardized response options along with mineable databases are critical for efficient data pooling across large numbers of employers, industries, and occupations. Loss reduction approaches and safety culture including safety program functioning, along with employer operations and demographics also could be covered. This would enable insurers and public health researchers to link standardized employer and exposure data with claims data, which is essential for identifying exposure outcome trends. Autocoding of claims data for standardized cause types would enable efficient use of nonstandardized text (Bertke et al., 2012; Bertke et al., 2016).

RC interviews indicated that six of the nine participating carriers recently transitioned to vendor-developed databases, possibly indicating increasingly widespread use in the US. Database vendors could make standardized questions available within their systems to carriers interested in adopting them. Such databases would facilitate data accessibility, while use of a core subset of questions would enable data pooling and linking of RC, employer, and claims data.

#### **Identification of validated assessment forms:**

Criteria for core exposure assessment questions include applicability across a range of industries and occupations, and established reliability and validity. Insurer interviews revealed that only a few questions from one insurer’s survey form had been validated. Finding suitable and validated forms can be difficult and time-consuming and may be beyond the scope of RC consultant responsibilities. This is an opportunity for occupational safety and health-focused agencies such as NIOSH and OSHA to identify appropriate forms and make them accessible. Numerous safety and health system and exposure assessment

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forms have been developed, with many having been validated. These include forms for assessing lockout/tagout programs (Yamin, Parker, Xi, & Stanley, 2017), physical exposures related to lifting (Garg et al., 2014), musculoskeletal risks to the hand (Bonfiglioli et al., 2012) musculoskeletal risks in specific industries (Howard, Bao, Lin, Hunter, & Haas, 2016, 2015a, 2015b), safety management systems/programs (Fernandez-Muniz, Montes-Peon, & Vazquez-Ordas, 2007; LaMontagne et al., 2004), occupational safety and health performance (Shea, DeCieri, Donohue, Cooper, & Sheehan, 2016), and safety culture (Frazier, Ludwig, Whitaker, & Roberts, 2013). A comprehensive review, selection, and listing of appropriate forms by health and safety agencies would be advantageous for many stakeholders. Database vendors could incorporate them or core subsets of questions into insurer databases, while public and private organizations could use them for self-audits. Public health researchers with access to employer data could use the standardized data for research and surveillance purposes.

#### **Study limitations:**

A recognized limitation of the project is that the participant group was small. In addition, participants were obtained through convenience sampling of attendees at insurance meetings also attended by the researchers, which could have introduced selection bias. It is likely that trends and additional characteristics would have been revealed with a larger, more diverse sample of participants. Although study findings may not generalize to the larger US WC carrier population, collected information did enable a qualitative description of RC practices.

#### **Next steps:**

Researchers will continue ongoing partnerships with insurer organizations to evaluate leading indicators and strategies for injury/illness prevention and risk reduction. This information will benefit the occupational safety and health community including RC departments and employers as they develop and implement safety training and programs, and evaluate and implement changes to reduce hazard exposures.

### **Conclusions and Practical Applications**

The WC system contains abundant data for improving workplace safety and health. While claims data are frequently used for surveillance and as health/safety outcome metrics, RC data remain largely underutilized. It is anticipated that the information collected in the current study will increase awareness and use of RC data for public health purposes. Toward this end, key collaboration opportunities for insurers, safety and health practitioners, and public health researchers were identified, with the goal of facilitating evidenced-based improvements in workplace safety and health.

### **Supplementary Material**

Refer to Web version on PubMed Central for supplementary material.

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## Appendix A

### Interview Questions

#### Insurer Background Survey

1. What risk control services does your company provide (e.g., safety, ergonomics, industrial hygiene)?
2. Number of risk control staff?
3. What is the organizational structure of the Risk Control Department?
4. Number of organizations insured by your company in the last two years?
5. Gross premiums for those insureds in the last two years?
6. How are risk control services funded (e.g., % of premium, fee charged to the insured)?
7. Are risk control services provided on an unbundled basis?
8. How are risk control services marketed?
9. How do risk control, underwriting, and claims departments interact with insured employers for occupational safety and health purposes?
10. Are individual account service plans developed for accounts? Is this done in collaboration with UW, claims, and/or policyholders?
11. Does your organization use WC claims and RC assessment information to benchmark insureds' performance, predict outcomes, and tailor RC service? Is this on an individual consultant/insured employer level, or on a broader scope to direct RC services?
12. How is the RC staff recruited and then trained to perform their jobs and use RC forms?
13. Are credentials required for RC staff and do they differ by consultant type (e.g., safety, ergonomics, industrial hygiene, etc.)?
14. Are external vendors used for prospective client surveys, RC surveys, and/or service visits? How are the qualifications of vendor consultants confirmed?
15. Are vendor consultants trained on insureds' processes and methodologies, not trained, or use their own processes, forms, etc.?

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16. What type of data/report management system is in place to order surveys, house reports and recommendations, etc.?
  17. What emerging technologies are consultants using for ergonomics, safety, and IH?
  18. On what basis are accounts assigned to consultants? Account size and/or premium, geographical location, loss history, area of consultant specialization/experience, etc.?
  19. For what purposes do RC consultants (including specialists) meet with insured employers (e.g., risk selection/renewal, account retention, risk/loss reduction)?
  20. What are the top three sectors your RC service targets?
  21. Number of visits per insured per year by risk control staff?
  22. Number of insured visits per month by each consultant?
  23. Number of accounts handled by each RC consultant?
  24. How are insureds made aware of available RC services?
  25. How does the insurance cycle (hard vs. soft markets) affect provision of RC services?
  26. How does RC work with brokers in providing service to insureds?

### WC Risk Selection Reports

27. How is the need for a risk selection site visit determined? What percentage of prospective accounts are visited onsite vs. other forms of contact (e.g., email, phone call)? Who makes the determination for the type of contact?
28. How were RC forms (including those for risk selection, risk assessment/renewal, and consultation/service reports) developed and was input solicited from internal partners (e.g., claims and UW departments) during form development or modification?
29. What type of quality control process is used before reports are released to underwriters and the insured? Are the same processes used for vendor reports? Are the same processes used for specialists' consultative reports?
30. Are recommendations submitted with risk selection reports? If so, is a library of standard recommendations available for consultants to use, especially for common hazards? Are standard recommendations available for risk assessment and special consultative reports?
31. Following RC visits to insureds' organizations, how are communications with the policyholder handled (e.g., formal, standardized follow-up letters, informal letters, email, no communications required)?
32. Is RC information used for premium setting or renewal purposes? Is information from specialists used for premium setting and renewal purposes?

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33. Does continued provision of RC service and consultation (specialists' service) to insured employers depend upon recommendation compliance?
  34. How is recommendation compliance encouraged (e.g., providing return on investment information, requirement for policy renewal)? Does this differ depending on the type and severity of hazard (e.g., ergonomics vs. serious safety violations or IH hazards) or whether recommendations were issued by specialists?
  35. How is the need for risk control service determined? Triggers for targeting those accounts? Who directs RC service to accounts – RC, UW, and/or claims departments? Goals of the visits? Does this process differ for specialists' services?
  36. Following RC visits to insureds' organizations, how are communications with the policyholder handled (e.g., formal, standardized follow-up letters, information letters, email, no communication necessary)?
  37. Is the effectiveness of risk control services, including generalists' and specialists' work, measured and tracked? If so, is effectiveness measured?
  38. Are loss analyses used in directing service to accounts? For directing the focus of RC efforts within an insured organization?

### WC Risk Control Consultation Reports

39. Do RC consulting reports have a standardized format for all types of service (e.g., safety, ergonomics, and IH)?
40. Following RC visits to insureds' organizations, how are communications with the policyholder handled (e.g., formal, standardized follow-up letters, informal letters, email, no communications required)?

### Underwriting

41. Number of underwriting staff?
42. How do risk control and UW departments work together with/for insured employers for occupational safety and health purposes?
43. Is RC information from RC consultants used for risk selection and premium setting purposes, and if so, do RC staff have direct input regarding risk selection?
44. Does your organization use input from specialty practice consultants (IH or ergonomics consultants) for risk selection and premiums setting purposes?
45. What role does UW play in directing service to insureds? Triggers for targeting those accounts? Goals of the visits?

### Claims

46. Number of claims staff?

47. How do RC and claims departments work together with/for insured employers for occupational safety and health purposes?
48. Does the claims department initiate RC requests for consultation/services? What are the triggers? Goals of the visits?

## Appendix B

### Glossary

**Agent:** An intermediary between an insurer and insurance buyer who sells insurance on behalf of an insurer.

**Assigned risk plan:** A method by which an entity that would typically be denied coverage in the normal insurance market is provided with insurance as required by state insurance codes. Insurance is provided by a pool of insurers required to offer coverage to these entities. (Insurance and Risk Management Institute, Inc., 2017.)

**Broker:** Serves as an intermediary between an insurer and an insurance buyer; represents the buyer.

**Carrier:** Organization acting as an insurer. (Utterback et al., 2014.)

**Claims adjuster:** Employed by an insurance carrier; evaluates claims to determine whether a carrier must pay a claim and how much they must pay.

**Class codes (workers' compensation class codes):** Codes that insurance companies use to identify specific categories of work. Categories distinguish between the degree of risk associated with the work being performed to estimate workers' compensation rates. (Worker's Compensation Class Codes, 2017, October 24.)

**Experience modification rate/factor:** A multiplier adjustment to an employer's premium based on claims history in comparison to the average loss experience of other employers in the same industry group. (Utterback et al., 2014.)

**Experience rating program:** An insurance premium setting plan in which an employer's premium is adjusted based on claims history in comparison to the average claims history of other employers in the same industry group.

**Loss/Losses:** The injury or damage sustained by a policyholder and covered by an insurance policy. (Loss in insurance. (n.d.))

**Loss potential:** The possibility of injury or damage.

**Loss ratio:** Insured losses divided by premiums earned over a given time period. (Utterback et al., 2014.)

**Premium/Premium level:** The amount a policyholder pays for insurance coverage.

Policyholder selection: The process by which insurers determine whether to provide insurance coverage to a company that has applied for insurance.

Prospect/Prospective policyholder: A potential customer or buyer of insurance.

Risk control department: A department within an insurance company made up of employees whose goal is to reduce the frequency and severity of accidental losses of their policyholders.

Subrogation: Occurs when a company pays a policyholder for damages and makes its own claim against a third party for reimbursement. The third party may have contributed to the loss, insured the loss, or caused the loss. (AMIS/Alliance Marketing & Insurance Services, 2011.)

Underwriter: A person who rates the acceptability of risks for insurance purposes. (Utterback et al., 2014.)

## Appendix C

### Common Topics Addressed on Risk Assessment Forms

Questions/topics included on WC forms	Question Category	Number of departments that addressed this topic
RTW program	Loss management	9
Description of operations (this was a general question requiring a narrative response from the consultant)	Description of operations	8
Union/non-union	Description of operations	8
Consultant's professional opinion of risk	Risk assessment	8
Management commitment to safety	Safety culture - leadership involvement	8
Assignment of responsibility for safety efforts	Safety culture - leadership involvement	8
Total number of employees	Description of operations	7
Drug/alcohol testing	Employment practices - new hire screening	7
Turnover	Employment practices - new hire screening	7
Confined space	Risk assessment	7
Fall protection	Risk assessment	7
PPE (including respirators and hearing protection)	Risk assessment	7
Designated medical provider	Loss management	7
Employee disciplinary policy for safety/safety rule compliance	Safety culture - safety initiatives/activities	7
Safety training provided to employees, mgrs, or supervisors	Safety culture - safety initiatives/activities	7
Full time/part time/seasonal employees	Description of operations	6

Questions/topics included on WC forms	Question Category	Number of departments that addressed this topic
Benefits provided	Employment practices - new hire screening	6
New employee safety training/orientation	Employment practices - new hire training	6
Lockout/tagout	Risk assessment	6
Ergonomics/material handling/repetitive motion	Risk assessment	6
Regulatory compliance/citations	Regulatory compliance	6
	Risk assessment	6
Recommendations/Areas in need of improvement as noted by RC consultants	Risk assessment	6
Safety program/Written safety manual	Safety culture - safety initiatives/activities	6
Subcontractors	Description of operations	5
Background/history of business/years in business	Description of operations	5
Physical exam/Pre-placement medical screening	Employment practices - new hire screening	5
Formal orientation	Employment practices - new hire training	5
Machine guarding	Risk assessment	5
Types of vehicles	Risk assessment	5
Number of vehicles	Risk assessment	5
MVR review	Risk assessment	5
Accident trends (as evaluated by RC consultant)	Risk assessment	5
Policyholder service requirements/Level of RC service needed.	Risk management rating	5
Does policyholder conduct accident investigations?	Safety culture	5
Does policyholder conduct hazard/risk evaluations?	Safety culture	5
Volunteers	Description of operations	4
Hiring practices: Interview conducted	Employment practices - new hire screening	4
Hazard communication	Risk assessment	4
Powered industrial truck/Forklift	Risk assessment	4
Electrical	Risk assessment	4
Emergency response/Emergency action plan	Risk assessment	4
Fleet safety rules developed	Risk assessment	4
Noise exposure/noise testing	Risk assessment	4
Loss Analysis (as conducted by RC consultant)	Loss analysis	4
Large loss information (provided by RC consultant)	Loss analysis	4
RTW program/hiring practices: Written job descriptions.	Loss management	4
Safety committee established	Safety culture - safety initiatives/activities	4

Questions/topics included on WC forms	Question Category	Number of departments that addressed this topic
Safety committee meetings held	Safety culture - safety initiatives/activities	4

## References

- Al-Tarawneh IS, Jordan S, & Rienerth M (2015). AASCIF Safety and Health/Loss Prevention Operations Questionnaire Results. Personal communication, Ohio Bureau of Workers' Compensation, Pickerington, Ohio.
- AMIS (Alliance Marketing & Insurance Services). 2011. Accessed October 3, 2017 from [http://www.amisinsurance.com/content/subrogation\\_information\\_article.php](http://www.amisinsurance.com/content/subrogation_information_article.php)
- Arkansas Workers' Compensation Commission. (2007). Rule 099.31 [http://www.awcc.state.ar.us/rules/rule099\\_31.pdf](http://www.awcc.state.ar.us/rules/rule099_31.pdf) (Accessed June 16, 2017.)
- Babik KR, Shockley TM, Moore LL, & Wurzelbacher SJ (2018) Standardizing industrial hygiene data collection forms used by workers' compensation insurers. Personal communication.
- Baril R, Clarke J, Friesen M, Stock S, & Cole D, Work-Ready group. (2003). Management of return-to-work programs for workers with musculoskeletal disorders: A qualitative study in three Canadian provinces. *Social Science & Medicine*, 57: 2010–2114. 10.1016/S0277-9536(03)00131-X
- Bertke SJ, Meyers AR, Wurzelbacher SJ, Bell J, Lampl ML, & Robins D (2012). Development and evaluation of a Naïve Bayesian model for coding causation of workers' compensation claims. *Journal of Safety Research*, 43: 327–332. DOI: 10.1016/j.jsr.2012.10.012 [PubMed: 23206504]
- Bertke SJ, Meyers AR, Wurzelbacher SJ, Measure A, Lampl MP, & Robins D (2016). Comparison of methods for auto-coding causation of injury narratives. *Accident Analysis & Prevention*, 88: 117–123. DOI: 10.1016/j.aap.2015.12.006 [PubMed: 26745274]
- Bonfiglioli R, Mattioli S, Armstrong T, Graziosi F, Marinelli F, Farioli A, & Violante F (2013). Validation of the ACGIH TLV for hand activity level in the OCTOPUS cohort: A two-year longitudinal study of carpal tunnel syndrome. *Scandinavian Journal of Work, Environment & Health*, 39(2): 155 – 163. DOI: 10.5271/sjweh.3312
- Bureau of Labor Statistics (2016). Employer-reported workplace injuries and illnesses – 2015. [https://www.bls.gov/news.release/archives/osh\\_10272016.pdf](https://www.bls.gov/news.release/archives/osh_10272016.pdf) (Accessed October 11, 2017.)
- Bureau of Labor Statistics (2015). Employer-reported workplace injuries and illnesses – 2014. [https://www.bls.gov/news.release/archives/osh\\_10292015.pdf](https://www.bls.gov/news.release/archives/osh_10292015.pdf) (Accessed October 11, 2017.)
- Burke MJ, Sarpy SA, Smith-Crowe K, Chan-Serafin S, Salvador RO, & Islam G (2006). Relative effectiveness of worker safety and health training methods. *American Journal of Public Health*, 96(2): 315–324. DOI:10.2105/AJPH.2004.059840 [PubMed: 16380566]
- Chung AZQ, & Shorrock ST (2011). The research-practice relationship in ergonomics and human factors – surveying and bridging the gap. *Ergonomics*, 54(5): 413 – 429. DOI: 10.1080/00140139.2011.568636 [PubMed: 21547787]
- Cohen A, & Colligan MJ (1998). Assessing occupational safety and health training: A literature review. DHHS (NIOSH) Publication No. 98–145. Retrieved from <https://www.cdc.gov/niosh/docs/98-145/pdfs/98-145.pdf>
- Collins L, Belke J, Halpern M, Katz R, Kunreuther H, & McNulty P (2002). The insurance industry as a qualified third-party auditor. *Professional Safety*, 47(4): 31–38. Retrieved from <http://aeasseincludes.asse.org/professionalsafety/pastissues/047/04/025899sh.pdf>
- Cullen KL, Irvin E, Collie A, Clay F, Gensby U, Jennings PA, Hogg-Johnson S, Kristman V, Laberge M, McKenzie D, Newnam S, Palagyi A, Ruseckaite R, Sheppard DM, Shourie S, Steenstra I, Van Eerd D, & Amick III BC (2018). Effectiveness of workplace interventions in return-to-work for musculoskeletal, pain-related and mental health conditions: An update of the evidence and messages for practitioners. *Journal of Occupational Rehabilitation*, 28(1): 1–15. DOI 10.1007/s10926-016-9690-x [PubMed: 28224415]

- Dunning KK, Davis KG, Kotowski SE, Elliott T, Jewell J, & Lockey J (2008). Can a transitional work grant program in a workers' compensation system reduce cost and facilitate return to work? *Journal of Occupational and Environmental Hygiene*, 5(9): 547–555. DOI: 10.1080/15459620802274927 [PubMed: 18607811]
- Estill CF Are noise and neurotoxic chemical exposures related to workplace accidents? Ph.D. Dissertation, Department of Environmental and Occupational Health, College of Medicine, University of Cincinnati, Cincinnati, Ohio, 2015. Retrieved from [https://etd.ohiolink.edu/pg\\_10?0::NO:10:P10\\_ACCESSION\\_NUM:ucin1439282244](https://etd.ohiolink.edu/pg_10?0::NO:10:P10_ACCESSION_NUM:ucin1439282244)
- Fernandez-Muniz B, Montes-Peon JM, & Vazquez-Ordas CJ (2007). Safety management system: Development and validation of a multidimensional scale. *Journal of Loss Prevention in the Process Industries*, 20: 52–68. DOI: 10.1016/j.jlp.2006.10.002
- Foley M, Fan ZJ, Rauser E & Silverstein B (2012). The impact of regulatory enforcement and consultation visits on workers' compensation claims incidence rates and costs, 1999–2008. *American Journal of Industrial Medicine*, 55: 976–990. DOI: 10.1002/ajim.22084 [PubMed: 22715086]
- Frazier CB, Ludwig TD, Whitaker B, & Roberts DS (2013). A hierarchical factor analysis of a safety culture survey. *Journal of Safety Research*, 45: 15–28. DOI: 10.1016/j.jsr.2012.10.015 [PubMed: 23708472]
- Frache R, Cullen K, Clarke J, Irvin E, Sinclair S, Frank J, and the Institute for Work & Health Workplace-Based RTW Intervention Literature Review Research Team. (2005). Workplace-based return-to-work interventions: A systematic review of the quantitative literature. *Journal of Occupational Rehabilitation*, 15(4): 607–631. DOI: 10.1007/s10926-005-8038-8 [PubMed: 16254759]
- Garg A, Boda S, Hegmann KT, Moore JS, Kapellusch JM, Bhoyar P, Thiese MS, Merryweather A, Deckow-Schaefer G, Bloswick D, & Malloy EJ (2014). The NIOSH lifting equation and low-back pain, Part 1: Association with low-back pain in the backworks prospective cohort study. *Human Factors*, 56(1): 6 – 28. DOI: 10.1177/0018720813486669 [PubMed: 24669540]
- Goetzel RZ, Tabrizi M, Henke RM, Benevent R, Brockbank CV, Stinson K, Trotter M, & Newman LS (2014). Estimating the return on investment from a health risk management program offered to small Colorado-based employers. *Journal of Occupational and Environmental Medicine*. (2014). 56(5): 554–560. DOI: 10.1097/JOM.0000000000000152 [PubMed: 24806569]
- Hogg-Johnson S, Robson L, Cole DC, Amick III BC, Tompa E, Smith PM, Van Eerd D, & Mustard C (2012). A randomized controlled study to evaluate the effectiveness of targeted occupational health and safety consultation or inspection in Ontario manufacturing workplaces. *Occupational and Environmental Medicine*, 69(12): 890–900. DOI: 10.1136/oemed-2011-100333 [PubMed: 22918898]
- Howard N, Bao S, Lin J, Hunter D, & Haas A (2016). Work-related musculoskeletal disorders (WMSDs) in Washington State: Services. A summary of research study findings. Safety and Health Assessment and Research for Prevention (SHARP) Program in the Washington State Department of Labor and Industries. [http://www.lni.wa.gov/Safety/Research/Files/Wmsd/Services\\_summary\\_FINAL.pdf](http://www.lni.wa.gov/Safety/Research/Files/Wmsd/Services_summary_FINAL.pdf)
- Howard N, Bao S, Lin J, Hunter D, & Haas A (2015a). Work-related musculoskeletal disorders (WMSDs) in Washington State: Manufacturing. A summary of research study findings. Safety and Health Assessment and Research for Prevention (SHARP) Program in the Washington State Department of Labor and Industries. [http://www.lni.wa.gov/Safety/Research/Files/Wmsd/Manufacturing\\_summary\\_FINAL.pdf](http://www.lni.wa.gov/Safety/Research/Files/Wmsd/Manufacturing_summary_FINAL.pdf)
- Howard N, Bao S, Lin J, Hunter D, & Haas A (2015b). Work-related musculoskeletal disorders (WMSDs) in Washington State: Wholesale and retail trade. A summary of research study findings. Safety and Health Assessment and Research for Prevention (SHARP) Program in the Washington State Department of Labor and Industries. [http://www.lni.wa.gov/Safety/Research/Files/Wmsd/Wholesale\\_summary\\_FINAL.pdf](http://www.lni.wa.gov/Safety/Research/Files/Wmsd/Wholesale_summary_FINAL.pdf)
- Insurance and Risk Management Institute, Inc. (2017.) [www.irmi.com/online/insurance-glossary/terms/a/assigned-risk-plan.aspx](http://www.irmi.com/online/insurance-glossary/terms/a/assigned-risk-plan.aspx) (Accessed April 2, 2018).
- LaMontagne AD, Barbeau E, Youngstrom RA, Lewiton M, Stoddard AM, McLellan D, Wallace LM, & Sorensen D (2004). Assessing and intervening on OSH programmes: effectiveness evaluation

- of the Wellworks-2 intervention in 15 manufacturing worksites. *Occupational and Environmental Medicine*, 61(8): 651–660. DOI: 10.1136/oem.2003.011718 [PubMed: 15258270]
- Liberty Mutual Research Institute for Safety. (2016). 2016 Liberty Mutual Workplace Safety Index. Hopkinton, MA. <https://www.silverstonegroup.com/wp-content/uploads/2011/07/2016-liberty-mutual-safety-index.pdf> Accessed April 2, 2018.
- Loss in insurance. (n.d.) A Law Dictionary, Adapted to the Constitution and Laws of the United States. By John Bouvier. (1856). <https://legal-dictionary.thefreedictionary.com/Loss+in+insurance> (Accessed October 24, 2017).
- Miller BM, Metz D, Smith TD, Lastunen J, Landree E, & Nelson C (2017). Understanding the economic benefit associated with research and services at the National Institute for Occupational Safety and Health: An approach and three case studies. Santa Monica, CA: RAND Corporation. [https://www.rand.org/pubs/research\\_reports/RR2256.html](https://www.rand.org/pubs/research_reports/RR2256.html).
- Missouri Department of Labor & Industrial Relations. (n.d.) Missouri Workers' Safety Program. <https://labor.mo.gov/MWSP> (Accessed April 2, 2018).
- Morin J, Utterback DF, Shor G, Welsh L, Bogyo T, & Wurzelbacher SJ (2015). Workers' compensation loss prevention information and interventions. *IAIABC Journal*, 5(1): 151–167. Retrieved from <https://www.iaiabc.org/iaiabc/default.asp>
- National Institute for Occupation Safety and Health (NIOSH). (2010). Use of workers' compensation data for occupational injury and illness prevention: Proceeding from September 2009 workshop. Utterback DF & Schnorr TM eds. Cincinnati, OH, NIOSH Publication No. 2010–152. Retrieved from <https://www.cdc.gov/niosh/docs/2010-152/pdfs/2010-152.pdf>
- National Institute for Occupational Safety and Health, Division of Applied Research and Technology (NIOSH, DART). (2017). Elements of Ergonomics Programs. <https://www.cdc.gov/niosh/topics/ergonomics/ergoprimer/default.html> (Accessed April 2, 2018).
- Nave ME, & Veltre A (2004). Effect of loss control service on reported injury incidence. *Journal of Safety Research*, 35: 39 – 46. DOI: 10.1016/j.jsr.2003.09.015 [PubMed: 14992845]
- Neuhäuser F, Seabury S, & Mendeloff J (2012). The impact of experience rating on small employers: Would lowering the threshold for experience rating improve safety? RAND Corporation. [https://www.dir.ca.gov/chswc/Reports/2013/SmallEmployerXModStudy\\_2013.pdf](https://www.dir.ca.gov/chswc/Reports/2013/SmallEmployerXModStudy_2013.pdf)
- Newman LS, Stinson KE, Metcalf D, Fang H, Brockbank C, Jinnett K, Reynolds S, Trotter M, Witter R, Tenney L, Atherly A, & Goetzel R (2015). Implementation of a worksite wellness program targeting small businesses: The Pinnacol Assurance health risk management study. *Journal of Occupational and Environmental Medicine*, 57(1): 14–21. DOI: 10.1097/JOM.000000000000279 [PubMed: 25563536]
- Occupational Safety and Health Administration (OSHA). (2016). [https://www.osha.gov/shpguidelines/docs/OSHA\\_SHP\\_Recommended\\_Practices.pdf](https://www.osha.gov/shpguidelines/docs/OSHA_SHP_Recommended_Practices.pdf) (Accessed April 2, 2018).
- Pennsylvania Department of Labor & Industry. (2016). Accident & Illness Prevention Service Provider Qualifications. <http://www.dli.pa.gov/Individuals/Workers-Compensation/publications/Pages/WC%20Act/PA-Workers-Comp-Rules--Regs-Chapter-129.aspx> (Accessed April 2, 2018).
- Robson LS, Stephenson CM, Schulte PA, Amick III BC, Irvin EL, Eggerth DE, Chan S, Bielecky AR, Wang AM, Heidotting TL, Peters RH, Clarke JA, Cullen K, Rotunda CJ, & Grubb PL (2012). A systematic review of the effectiveness of occupational health and safety training. *Scandinavian Journal of Work, Environment & Health*, 38(3): 193–208. DOI: 10.5271/sjweh.3259
- Rothmore P, Karnon J, & Aylward P (2013). Implementation of interventions to prevent musculoskeletal injury at work – lost in translation? *Physical Therapy Reviews*, 18(5): 344 – 349. DOI: 10.1179/1743288X13Y.00000000092
- Schofield KE, Alexander BH, Berberich SG, & MacLehose RF (2017). Workers' compensation loss prevention representative contact and risk of lost-time injury in construction policyholders. *Journal of Safety Research*, 62: 101–105. 10.1016/j.jsr.2017.06.012 [PubMed: 28882256]
- Shea T, De Cieri H, Donohue R, Cooper B, & Sheehan C (2016). Leading indicators of occupational health and safety: An employee and workplace level validation study. *Safety Science*, 85: 293–304. 10.1016/j.ssci.2016.01.015

- Shockey TM, Babik KR, Wurzelbacher SJ, Moore LL, & Bisesi M (2018). Determining industrial hygiene data collection, storage, and usage among state-based and private workers' compensation insurers. *Journal of Occupational and Environmental Medicine*.
- Schulte PA, Okun A, Stephenson CM, Colligan M, Ahlers H, Gjessing C, Loos G, Niemeier RW, & Sweeney MH (2003). Information dissemination and use: Critical components in occupational safety and health. *American Journal of Industrial Medicine*, 44: 515–531. DOI: 10.1002/ajim.10295 [PubMed: 14571516]
- Texas Department of Insurance. (2017). Guide for Loss Control/Risk Management Evaluations. <http://www.tdi.texas.gov/commercial/lcguide.html> (Accessed on April 2, 2018).
- Tompa E, McLeod C, & Mustard C (2016). A comparative analysis of the financial incentives of two distinct experience-rating programs. *Journal of Occupational and Environmental Medicine*, 58(7): 718–727. DOI: 10.1097/JOM.0000000000000754 [PubMed: 27124725]
- Tompa E, Trevithick S, & McLeod C (2007). Systematic review of the prevention incentives of insurance and regulatory mechanisms for occupational health and safety. *Scandinavian Journal of Work, Environment & Health*, 33(2): 85 – 95. DOI: 10.5271/sjweh.1111
- Utterback DF, Meyers AR, & Wurzelbacher SJ (2014). Workers' compensation insurance: A primer for public health. National Institute for Occupational Safety and Health. Cincinnati, OH. DHHS. (NIOSH) Pub No. 2014–110. Retrieved from <https://www.cdc.gov/niosh/docs/2014-110/pdfs/2014-110.pdf>
- Ward Group. (2016). Ward Group Website: [www.wardinc.com](http://www.wardinc.com) (Accessed on April 2, 2018).
- Worker's Compensation Class Codes. (2017, 10 24). Retrieved from <https://classcodes.com/workers-compensation-class-codes/>
- Wurzelbacher SJ, Bertke SJ, Lampl ML, Bushnell PT, Meyers AM, Robins DC, & Al-Tarawneh IS (2014 12). The effectiveness of insurer-supported safety and health engineering controls in reducing workers' compensation claims and costs. *American Journal of Industrial Medicine*, 57(12): 1398–412. DOI: 10.1002/ajim.22372 [PubMed: 25223846]
- Wurzelbacher SJ, Al-Tarawneh IS, Meyers AR, Bushnell PT, Lampl MP, Robins DC, Tseng C, Wei C, Bertke SJ, Raudabaugh JA, Haviland TM, & Schnorr TM (2016). Development of methods for using workers' compensation data for surveillance and prevention of occupational injuries among state-insured private employers in Ohio. *American Journal of Industrial Medicine*, 59: 1087–1104. DOI: 10.1002/ajim.22653 [PubMed: 27667651]
- Wurzelbacher SJ, & Jin Y (2011). A framework for evaluating OSH program effectiveness using leading and trailing metrics. *Journal of Safety Research*, 42: 199–207. DOI: 10.1016/j.jsr.2011.04.001 [PubMed: 21855691]
- Whysall ZJ, Haslam RA, Haslam C (2004). Processes, barriers, and outcomes described by ergonomics consultants in preventing work-related musculoskeletal disorders. *Applied Ergonomics*, 35, 341 – 351. DOI: 10.1016/j.apergo.2004.03.001
- Yamin SC, Parker DL, Xi M, & Stanley R (2017). Self-audit of lockout/tagout in manufacturing workplaces: a pilot study. *American Journal of Industrial Medicine*, 60: 504–509. DOI 10.1002/ajim.22715 [PubMed: 28370203]

**Table 1.**

Organizational elements that characterize RC departments in participating insurer organizations.

Organizational Element	
<b>Department Size</b>	<ul style="list-style-type: none"> <li>Four departments: 4 – 20 employees</li> <li>Four departments: 45 – 60 employees</li> <li>One department: 215 employees</li> </ul> <p>Totals included management/corporate staff, and consultants who provided onsite assistance to policyholders.</p>
<b>Department Organization</b>	<ul style="list-style-type: none"> <li>Six RC departments were organized into one group of consultants who provided policyholders with both onsite and telephonic services.</li> <li>Three RC departments were comprised of one group of consultants who provided smaller accounts with telephonic consultation and a second group who provided larger accounts with onsite service.</li> </ul>
<b>Reporting Structure</b>	<ul style="list-style-type: none"> <li>Eight departments were centrally organized with all consultants reporting to the head of the RC department.</li> <li>One department used a decentralized reporting structure with consultants reporting to a supervisor outside the RC department.</li> </ul>
<b>Technical Specialists</b>	<p>In addition to core RC consultants employed by all departments:</p> <ul style="list-style-type: none"> <li>Six departments employed industrial hygiene specialists;</li> <li>Four departments employed ergonomics specialists/practice leaders.</li> </ul>
<b>Department Funding</b>	<ul style="list-style-type: none"> <li>Four departments were funded with a percentage of insurance premiums.</li> <li>Five departments were funded with a budget independent of insurance premiums.</li> </ul>

**Table 2.**

Topics addressed on most participating departments' risk assessment forms.

Question Topic	Question Category	Total number of RC departments that addressed the topic
RTW program	Loss management	9
Description of operations (this was a general question requiring a narrative response from the consultant)	Description of operations	8
Union/non-union	Description of operations	8
Consultant's professional opinion of risk	Risk management rating	8
Management commitment to safety	Safety culture - leadership involvement	8
Assignment of responsibility for safety efforts	Safety culture - leadership involvement	8