



Effect of loss control service on reported injury incidence

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Abstract

Introduction: A retrospective analysis evaluated the effectiveness of an insurance carrier's flexible loss control service strategy in reducing workers' compensation policyholders' reported injury and illness claims. **Objectives:** To assess the effects of a loss control service strategy on workers' compensation claim frequency rates, on medical-only claim rates, on severity-claim rates, and on claim cost among a group of California employers. **Methods:** Eighty-two small- and medium-sized companies with workers' compensation policies expiring in 1999 were randomly selected from a population of policyholders assigned to loss control consultants for two or more years. Claim performance data were obtained for each company's first expired in-force policy year and its 1999 expired policy year. The retrospective design was combined with a control component based on a randomly selected comparison group of 45 companies whose first policy year with the insurer expired in 1999 and who received safety services from the loss control staff. **Results:** The flexible loss control consultation service strategy was associated with lower average claim rates and costs. Companies assigned to a loss control consultant for two or more years (the "outcome group") had an average claim rate of 1.24 per \$10,000 premium, compared with a rate of 1.62 in the "initial group" and a rate of 1.60 in the "comparison group." The average severity-claim rate of the outcome group was 0.32, compared with the initial-year and comparison-group means of 0.48 and 0.46, respectively. The average medical-only claim rate was 0.92, compared with the initial- and comparison-group means of 1.14 and 1.14. The outcome group's average loss ratio was over 10% lower than that of the initial and comparison groups. Statistical analysis indicated that differences among the groups' claim rates and severity-claim rates were [$F=(2,206) 4.938, P=0.008$] and [$F=(2,206) 8.208, P<0.001$], respectively. **Conclusions:** A loss control service strategy that provides service flexibility and develops partnership between employer and consultant can help reduce the frequency and severity of workers' compensation claims. Barriers to consultation service flexibility, both internal and external, should be identified and removed to enhance service efficacy.

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1. Introduction

Historically, workers' compensation insurance companies have tended to formulate a loss control strategy focused primarily on meeting the internal information needs of the underwriting function. Typically, those needs include an up-front assessment (before policy acceptance) depicting a potential client's level of risk and risk control capabilities and later, after policy issuance, documentation of formal recommendations to the client based on the command-and-control service strategy. This loss control strategy, while meeting the short-term information and action calendar approach frequently used in the underwriting function, is

based on the assumption that the client, fearing policy cancellation, will comply with loss control recommendations in a timely manner.

Because this strategy is internally driven and technically grounded on a command-and-control model, it frequently falls short in assessing the following factors: (a) the actual level to which the client's occupational safety and health management strategy has developed; (b) the operating structure of the organization; (c) the financing arrangements; and (d) the extent of the organization's technical wherewithal for confronting and managing occupational safety and health issues.

Supported by the short-term recommendation-based approach, an internally driven service strategy restricts the insurance carrier's long-term ability to maximize performance and successfully compete in the workers' compensation marketplace. In cases where the insurance carrier's

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loss control operation can adequately assess an organization's risk exposures and control, the loss control services provided by the insurance carrier's representative still focus only on recommendations, failing to provide the policyholder's staff with the knowledge, skill, or capabilities to reduce exposures and improve controls. The internally focused strategy may be effective during times when predictable market conditions allow the insurance carrier to obtain adequate premium rates for a policyholder's risk exposures, but this strategy falls short during periods of premium rate inadequacy.

A distinct group of insurers has been employing an externally driven loss control strategy as a means of assisting customers to control risk while simultaneously enhancing the insurers' and customers' financial performance. Can a business case be made for this approach? Instead of focusing on a series of activities that tend to be internally compliance driven, should workers' compensation insurers consider an externally driven loss control service strategy that goes beyond traditional internally driven service strategies or state-mandated service requirements?

The study reported here assessed a flexible loss control service strategy and the effect of the strategy on the incidence rates of customer claims. The objective was to evaluate the effectiveness of a loss control service strategy in reducing the frequency and severity rates of workers' compensation claims. The study evaluated a service strategy that gives the loss control consultants of the insurance carrier the freedom to participate actively in the identification, planning, and delivery of outcome-based loss control service activities.

1.1. Problem statement

The objective was to evaluate the effectiveness of a loss control service strategy in reducing the frequency and severity rates of workers' compensation claims. The study evaluated a service strategy that gives the loss control consultants of the insurance carrier the freedom to participate actively in the identification, planning, and delivery of outcome-based loss control service activities.

1.2. Basic purpose/tool

The purpose of this study was to assess the impact of loss control services on the frequency rates of workers' compensation claims relative to premiums. The central issue was to determine if loss control services contribute to achieving insurance carriers' performance and financial goals by effectively helping customers, or policyholders, to reduce the frequency and severity of work-related losses.

The study had two objectives:

1. to determine if a loss control service strategy had an impact on workers' compensation frequency rates, on medical-only claims, and on severity-claim rates and

2. to determine if a loss control service strategy had an impact on the cost of work-related injury and illness claims.

2. Literature review

In a literature review completed for the Commission on Health and Safety and Workers' Compensation (CHSWC), [McCarten-Gibbs \(1995\)](#) noted that there was "very little empirical data available on the subject of loss control services provided by insurance carriers" and considered the subject a "neglected topic." With the passing of time, the availability of empirical data related to the loss control services of insurance carriers continues to be limited. Since [McCarten-Gibbs's](#) review, the workers' compensation insurance environment has experienced a significant evolution that has challenged and, in many cases, altered the purpose and function of insurance carriers' loss control operations.

2.1. Loss control: purpose and function

The insurance industry has actively participated in the modern safety movement, with many insurance carriers having financed and provided voluntary loss prevention services for many years. ([Collins et al., 2002](#); [Dembe, 1995](#)). Although insurers have been active participants in safety and health, business and financial relationships between the insurer and customer can limit the availability of the insurers' loss control services. Because loss control services focus on protecting the financial assets of the insurance carrier, they are not designed to be comprehensive nor to guarantee a safe workplace ([Dembe, 1995](#)).

Given that workers' compensation insurance is a product that charges a price (the premium rate) based on a cost that will only be known in the future, information regarding prior loss experience and current operational procedures are analyzed by underwriters as part of the business acquisition and retention process. Historically, loss control information has been considered an important part of the underwriting business acquisition model. Within the traditional insurance business model, loss control serves a supporting function in the acquisition process. Because the traditional focus defines the primary responsibilities of the loss control service within the context of supporting the underwriting function and controlling insurance losses, prevention efforts are often limited to hazard identification, guidance, support, and training ([Dembe, 1995](#)).

Although supporting a traditional underwriting-based approach to loss control services, [Dembe \(1995\)](#) states that the greatest service benefits can be achieved through an environment that allows for service flexibility and active participation between the employer and consultant. Recognizing the potential benefits of directing the primary responsibilities of a loss control service beyond its function as

a tool in the information-gathering process, some insurers have worked to develop complementary internal systems that allow the loss control staff increased flexibility when working with customers.

Recently, Collins et al. (2002) identified risk assessment, risk reduction, and relationship development as the primary functions of an insurance carrier's loss control service. The authors state that service effectiveness requires individuals to serve as consultants, assisting organizations to reduce actual and potential losses. Consultant activities should include providing recommendations targeting reductions in loss potential, identifying critical activities, developing service plans, and teaching employers how to implement recommendations. While recognizing the considerable time investment these activities require from the consultant, the authors note that the approach has resulted in up to 40% reduction in injury frequency over a 2-year period.

2.2. Regulating loss control services

Prior to the workers' compensation reform efforts of the 1990s, insurer-provided loss control services were based on voluntary business decisions. Many insurers provided loss control services in support of the underwriting function, but the scope of services beyond those required to meet internal needs varied by insurer. During downturns in market cycles, operating expenses were closely examined and reduced based on insurers' business plans. An example of how insurers' business plans influenced loss control service is presented in Maine's 1988 residual market rate proceedings. The proceedings reported that some insurance carriers reduced or eliminated loss control services to compensate for insurance losses (McCluskey, 2001). Although Harrington and Danzon (2000) have concluded that reductions in insurer loss control services lead to higher claim costs and Dembe (1995) has stated that loss control service expense has historically been 1 to $1\frac{1}{2}$ of underwriting expense. Examples such as the experience in Maine appear to indicate that insurance company executives do not associate a financial benefit with the minimal expense incurred by insurance carrier loss control departments.

While considering approaches to reduce workers' compensation costs, policy makers looked at a variety of measures expanding safety regulations, including mandating insurer loss control services. Dembe (1995) stated that policy makers were influenced in their support for the legislative initiatives by a belief that regulating insurance carrier loss control services would improve workers' compensation costs. In an attempt to achieve this end, the requirements frequently included regulations governing the type and quantity of services provided by insurers, service staff qualifications, and submission of detailed reports summarizing the services. In addition to limiting or removing the loss control service decision from the insurance carriers, some state reform efforts restricted insurers' ability to charge any additional fees for loss control services.

Spieler (1994) noted that action by many states supported regulatory expansion. The regulatory expansion included measures requiring insurance carriers to provide loss prevention services, mandating what had once been a voluntary service (Insurance Information Institute, 2001; Smitha, Oestestad, & Brown, 2001). By 1997, eleven states included provisions mandating that insurance carriers provide loss control services.

However, the effectiveness of mandatory loss control service requirements was questioned by various authors, including Guarascio (1992), Dembe (1995), and Lessner (1997). Guarascio questioned the policy makers' belief that insurance loss control service could be a "major component" in effectively controlling workers' compensation. Guarascio argued that safety is the responsibility of the employer and that the provision of loss control services can "enhance" the employer's safety program only if supported by the employer. By removing the voluntary and cooperative relationship between the insurer and employer, mandatory service programs would limit the exchange of information required for effective loss control service. Placing a greater value on the effectiveness of a proactive loss control service approach, Guarascio concluded that mandatory service requirements would fail to guarantee appropriate loss control services, while creating a system that would increase service expense.

Following the reform approach taken by other states, California's 1993 workers' compensation legislation included requirements mandating that insurers provide loss control services certified by the state. In its analysis of the mandatory program, the California Division of Occupational Safety and Health (DOSH, 2000) noted that the impetus behind the legislative action was "to assure California employers that loss control services would be available and be provided at no additional cost above that charged to them as premium." Although not requiring that services be provided to all employers, California's law stated that mandatory services were to be provided to "employers identified by insurer as most in need of those services."

The DOSH (2000) report evaluating the performance of the California mandatory-service program concluded that additional regulatory changes would improve the program. DOSH noted that it was unable to track employers' performances when the employers moved between insurers; nor was DOSH able to discern whether the mandatory service requirements contributed to a reduction in the availability of insurer loss control services to employers for whom the services were not mandatory. In evaluating insurers, DOSH reported two interesting points. First, insurers frequently failed to adequately identify the employers with the most significant preventable hazards. Second, insurers' mandatory-service budget expense, as a percentage of direct written premiums, declined in 1999. DOSH noted that insurers reported a total mandatory-service budget expense of 0.89% of direct written premium in 1999, down from

0.97% in 1998. In addition, the [California Department of Industrial Relations \(2000\)](#) reported that insurers did not always provide mandatory loss control services in a timely manner.

2.3. Workers' compensation injury trends

A general reduction in workers' compensation and OSHA-reportable injury rates during the 1990s has been noted by organizations and researchers. A comparison of injury frequency and severity rates indicates that reductions in severity (lost-time) related injury rates have been greater than reductions in total injury rates ([Conway & Svenson, 1998](#)). Although there has been a decline in the number of workers' compensation claims per employee, the [Insurance Information Institute \(2001\)](#) reports that the decline is slowing.

While injury rates declined during the 1990s, the costs of workers' compensation claims did not follow a similar trend. In a review of states' workers' compensation reform efforts, the [Insurance Information Institute \(2001\)](#) reported that the National Council on Compensation Insurance (NCCI) projected a combined workers' compensation industry loss ratio of 121 for the 2000 calendar year, an increase from 116 in 1999 and 108 in 1998. The [California Department of Insurance \(2001\)](#) reported that the number of nonfatal job-related injuries/illnesses continued to decline in California during 1999, while the total claims cost continued to increase. During the period from 1995 through 1999, the annual total claims cost among California employers increased by over \$2.5 billion. During the same period of time, the Workers' Compensation Insurance Rating Bureau of California (WCIRB) reported the average California indemnity claim cost increased over \$14,000, from \$22,738 to \$36,915 ([Commission on Health and Safety and Workers' Compensation, 2002](#)).

Although claim rates and costs are significant factors in an analysis of workers' compensation trends, analysis of California trends is influenced by the effect of California's 1993 open-rating legislation on insurers' business retention. Prior to open rating, the WCIRB estimated that about 25% of experience-rated California employers changed insurance carriers annually. After open-rating in 1995, approximately 35% of the employers changed insurers. By the first quarter of 2001, nearly 50% of the employers with expiring policies changed insurance carriers ([Commission on Health and Safety and Workers' Compensation, 2002](#)).

3. Assumptions

The study reported here is based on the following assumptions:

1. Measurable outcomes associated with the loss control service cycle—including hazard identification, plan

development, implementation, and evaluation—span an extended period of time.

2. California workers' compensation premium rates, underwriting practices, claim management, and reserving practices associated with injuries and illnesses vary among insurance carriers.
3. Payroll classification-based premium rates are calculated from historical loss data and from risk inherent within the classifications.
4. In addition to insurance carrier practices related to the application of experience modification rates, the open rating practices of insurance carriers creates variability in the premium rates charged to customers with the same payroll classifications.

4. Limitations

The following study limitations are acknowledged:

1. The premium-based denominator used in the injury rate formula is influenced by the workers' compensation class code, by payroll, and by experience modification.
2. As a result of changes effective January 1, 1995, in the methods used to develop and apply California workers' compensation premium rates, the study was limited to customers whose first policy was effective on or after January 1, 1995.
3. Because of the state-specific nature of workers' compensation rates, the study was limited to employers' California operations.
4. The study was limited to policyholders assigned to a loss control consultant, resulting in the exclusion of non-serviced customers, which are frequently companies with smaller premiums.
5. Although the experience of loss control staff and the types of policyholder operations were similar in the regional operations selected for study, the study selection process was not stratified by type of industry or premium size among regional operations or among the outcome, initial, and control groups.
6. As a result of the retrospective study design, sample randomization was limited to the selection of study participants after the policyholder was identified as meeting the selection criteria for the outcome or control group.
7. To aid in controlling for homogeneity relative to the types of customers and the qualifications of the servicing staff, the selection process was limited to customers assigned to one of two insurance carrier offices.

5. Methods

The study used a retrospective design to evaluate the effectiveness of a flexible loss control service strategy in

reducing the reported claims and claim costs of workers' compensation policyholders. To assess the effects of the loss control service strategy on workers' compensation frequency rates, on medical-only claim rates, on severity-claim rates, and on claim costs among a group of California employers, the study selected three sample groups (See Fig. 1).

The post-survey outcome group (Group 1) consisted of small- and medium-sized companies with California workers' compensation policies expiring during the 1999 calendar year. To qualify for the selection pool, companies had to meet three criteria. First, a company's first policy year with the insurer did not precede the 1995 enactment of California's open-rating legislation. Second, the company had been a customer of the insurance carrier for two or more years. Third, the company had been assigned to a loss control staff member. From the qualified population, 82 companies were randomly selected as outcome group participants. The pre-survey "initial" group (Group 2) was compiled using the workers' compensation loss data from the outcome group members' (Group 1) first policy year with the insurance carrier.

The study's retrospective design incorporated a control component. The third group (the "comparison group") was randomly selected from a customer population meeting two criteria. First, the customers had been assigned to a loss control staff member. Second, the customer's first policy year with the insurer expired in 1999. Forty-five customers were randomly selected from the qualifying population.

The three-study-group design provides a means of comparing performance within a group of customers over a

period of time while comparing the customers' outcomes with those of a separate group during the same period of time. The survey design assists in controlling for changes in premium rates, marketing strategy, and claim-reserving practices.

Performance data obtained included reported claims, medical-only claims, severity (indemnity) claims, and earned premium by policy year for each customer within the three groups. To control for late claim reporting and claim development, the customers' loss data were valued as of June 2001, 18 months after expiration of the final policy. Sum totals were obtained for each data set. Minimum and maximum values were identified and averages were calculated for the claims data.

Loss control service data for customers in each study group were obtained from the insurer's loss control information management system. The customer service activities were self-reported on a weekly basis by the loss control staff member that provided the services. The service staff classified each service activity, in quarter-hour increments, into one of eight service categories.

Using the insurance data, the reported claims, the medical-only claims, the severity-claim rates, and the loss ratio were calculated for the three customer groups. Earned premium was used as the denominator to calculate rates on a "per-\$10,000-earned-premium" basis. The loss-ratio value was calculated on the basis of claim cost as a percent of earned premium.

The initial step in the analysis process was the completion of a descriptive review to determine if, in comparison with the initial group, the outcome group had improved performance results. The second step was a comparison of

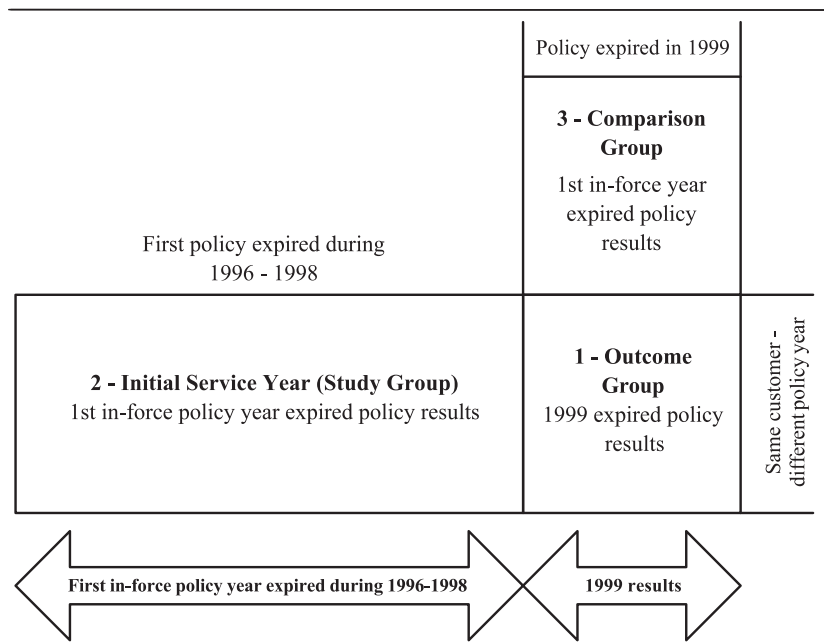


Fig. 1. Study survey design.

Table 1
Descriptive summary

	Outcome group	Initial group	Comparison group
N	82	82	45
Total annual earned premium	\$13,379,129	\$11,535,873	\$ 7,007,866
Average company premium	\$ 163,160	\$ 140,068	\$ 155,730
Minimum company premium	\$ 33,423	\$ 11,194	\$ 42,096
Maximum company premium	\$ 701,895	\$ 521,925	\$ 948,577
Total incurred claims cost	\$ 12,749,429	\$10,769,521	\$ 8,306,062
Average company claims cost	\$ 155,481	\$ 131,335	\$ 184,579
Minimum company claims cost	\$ 305	\$ 944	\$ 1,903
Maximum company claims cost	\$ 1,456,982	\$ 1,546,644	\$ 1,068,127
Total reported claims	1,646	1,791	1,073
Total medical only claims	1,192	1,260	777
Total severity-claims	531	454	296

the claim rates and the loss ratios of the groups. This was followed by a review of the average claim rates and the average loss ratio.

On the basis of customers' claim rates and loss ratios, confidence intervals (95%) were calculated for the reported-claim rate, the medical-only rate, the severity-claim rate, and the loss ratio of each of the three groups. Additional statistical analyses were completed using MANOVA. The independent variables were the three sample group classifications. The dependent variables were the groups' three claim rates and loss ratio. Pillai's Trace was selected as the multivariate test of significance due to unequal sample size. Univariate *F*-test statistics were obtained to measure the effect of the independent variable on the dependent variables. Variable effects identified by the *F*-test analyses were evaluated using Bonferroni.

The study did not examine the impact of loss control services provided during the first policy year on customers' performance relative to performance measures from the last policy year with the customers' prior insurance carriers. This design decision was due in part to the difficulty in collecting reliable prior-carrier data and the time lag that frequently occurs in obtaining measurable outcomes following the delivery of service activities. The lag period between a service activity—whether consultation, education, or information—and a measurable outcome is influenced by a number of variables. Factors that can influence service outcomes include the employer's decision to implement the program component and the timeline on which a program component will be implemented. Also, injuries may not be a regular occurrence in many organizations. Thus, the passage of time between service activity and measurable outcomes may affect the ability to obtain reliable statistical measures over short periods.

6. Results

Overall, the flexible loss control service strategy used in the outcome group was associated with lower average reported claim rates and claim costs. Companies assigned to a loss control consultant for two or more years (outcome group) had an average reported claim rate of 1.24 per \$10,000 premium, compared with an initial-group rate of 1.62 and a comparison-group rate of 1.60. The outcome group's average severity-claim rate was 0.32, compared with means of 0.48 and 0.46 for the initial and comparison groups, respectively. The initial and comparison groups' average medical-only claim rate of 1.14 was higher than the outcome group's rate of 0.92. The outcome group's average loss ratio was over 10% lower than that of the initial and comparison groups.

A descriptive summary of the sample groups' data totals is presented in Table 1. The table includes sample group values for various measures, including total earned premium, average premium, total incurred claim cost, average claim cost, number of reported claims, medical-only claims, and severity-claims. Group-based average premium per customer ranged from \$140,068 to \$163,160. Average group incurred claim cost per customer ranged from \$131,335 to \$184,579. The maximum incurred customer claim cost ranged among the groups from \$1,068,127 to \$1,546,644.

Because many of this study's analytical methods rely on earned-premium-based rates, it is important to note that the earned-premium total for the outcome sample (Group 1) increased 16% compared with the same customers' first policy year (initial sample—Group 2). Although it is possible that premium growth was due to rate increases, market conditions for California workers' compensation insurance during the study period make it probable that the growth was driven by continuing economic expansion during the 1990s, including increased overtime and new-employee hiring practices.

Comparison between the performances of the outcome and initial groups on a per-measure basis indicates that a higher number of outcome-group customers achieved improved claim performance (Table 2). Compared with initial-policy-year results for the 82 customers, 51 outcome-group customers achieved a reduction in their reported claim rate. Fifty-four customers experienced reductions in severity-claim rate. Over 54% of the outcome-group customers had reductions in medical-only claim rates and loss ratios.

Table 2
Outcome group member change compared to first year performance

	Increased	Decreased
Reported claim rate	31	51
Medical only claim rate	37	45
Severity-claim rate	28	54
Loss ratio	36	46

Table 3
Average claim rates per \$10,000 earned premium and loss ratio by group

	Outcome group	Initial group	Comparison group
Reported claim rate	1.24	1.62	1.60
Standard deviation	(0.793)	(0.861)	(0.919)
Medical only claim rate	0.92	1.14	1.14
Standard deviation	(0.695)	(0.688)	(0.816)
Severity-claim rate	0.32	0.48	0.46
Standard deviation	(0.222)	(0.322)	(0.268)
Loss ratio	85.32	94.84	119.37
Standard deviation	(92.87)	(94.11)	(111.49)

A descriptive summary of the groups' claim rates per \$10,000 earned premium and loss ratios is presented in Table 3. Table 3 indicates consistent performance improvement when the outcome group is compared with the other groups. Based on the customers' average claim rates and loss ratio data presented in Table 3, the outcome group's claim rates and ratio are lower than those of the other two study groups. All of the outcome group's average claim rates and loss-ratio performance measures are more than 19% lower than the other two groups' performance results. The outcome group's average loss ratio (85.32%) was more than 10% lower than that of the initial group (94.83%), the second lowest group. The outcome group's average severity-claim rate (0.32) was more than 30% lower than that of the comparison group (0.46), the second lowest group.

Admittedly relying on self-reported data from loss control staff members, Table 4 provides a comparison of reported service activities and identifies the percentage of service time spent on each class of activity for each study group. In addition to information on service activities, the table includes the average on-site service hours by group. On-site service time varied among the three groups only by a maximum of 0.2 hours per service visit. The table indicates that, as a percentage of service time, management consultation, industrial hygiene, and employee training among service staff working with the outcome group were provided at reduced levels, compared with the other groups. The service staff focused increased outcome-group services on assessment, incident investigation, and supervisor-training activities. Compared with the initial group, both the

Table 4
Percent of consultant customer service time by service activity (consultant self-reported)

	Outcome group	Initial group	Comparison group
Management consultation	23.6	36.5	28.2
Assessment of operation	29.7	21.8	27.0
Incident investigation	15.1	10.9	12.8
Industrial hygiene	1.3	7.1	5.1
Management training	7.6	8.3	6.5
Supervisor training	10.3	7.4	6.3
Employee training	4.8	5.9	5.7
Policyholder seminars	7.6	2.1	8.4
Average on-site service hours	1.6	1.7	1.5

Table 5
95% confidence interval — Average claim rates and loss ratio by group

	Outcome group	Initial group	Comparison group
Reported claim rate	(1.061, 1.410)	(1.430, 1.808)	(1.326, 1.878)
Medical only rate	(0.767, 1.073)	(0.988, 1.290)	(0.895, 1.385)
Severity-claim rate	(0.268, 0.366)	(0.410, 0.541)	(0.375, 0.450)
Loss ratio	(64.910, 105.723)	(74.161, 115.519)	(85.875, 152.868)

outcome and the comparison groups had service staffs reporting a higher percentage of time spent on activities associated with group service seminars.

Moving beyond the basic descriptive analyses, the study calculated confidence intervals for the groups' four dependent variables. Data presented in Table 5 indicate that the upper confidence-interval boundaries for the outcome group's severity-claim rate were less than the lower confidence-interval boundaries for equivalent measures in the other groups. The outcome group's reported claim rate confidence-interval boundaries also differed from the initial group's boundaries.

Analyses of the interaction between the independent variable and four dependent variables were conducted using MANOVA. Multivariate analysis was completed using Pillai's Trace. The analysis indicates a statistically significant interaction ($P > 0.05$) among the variables [$F = (8, 408) 3.513, P = 0.001$].

Tests of between-subjects effects (Table 6) analyzed the effect between the groups' dependent variables. Univariate F -test analyses indicate statistically significant differences ($P > 0.05$) between the groups' reported claim rates [$F = (2, 206) 4.938, P = 0.008$] and severity-claim rates [$F = (2, 206) 8.208, P < 0.001$].

As a result of the significant differences in effect within the dependent variables, further analysis was completed using a post hoc multiple comparison for observed means (Bonferroni). The results indicated there was a significant difference in the service outcome group's severity rate mean compared to both the initial service group ($P = 0.001$) and comparison group ($P = 0.016$) means. The results of the comparison of group injury frequency rate means between the service outcome group to the means of the initial service groups ($P = 0.018$) and comparison group ($P = 0.063$) were not as significant as those noted in the group severity rate means analysis.

Table 6
Tests of between-subjects effects — Univariate ANOVA F -test results

	df	F	Significance
Reported claim rate	(2, 206)	4.938	0.008
Medical only rate	(2, 206)	2.312	0.102
Severity-claim rate	(2, 206)	8.208	0.000
Loss ratio	(2, 206)	1.785	0.179

7. Conclusions

The following conclusions are drawn from the study:

1. That a loss control service strategy that provides service flexibility and develops partnership between employer and consultant can contribute to reducing the frequency and severity of workers' compensation claims.
2. That a flexible loss control service strategy can contribute to improved customer workers' compensation performance.

In summary, the ultimate reality is that both the analysis and the content of a loss control service strategy as a voluntary action of an insurance carrier will over time be only as good or as sustainable as are the underlying business reasons and the financial benefits to the client.

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