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RESEARCH ARTICLE

Comparing disability and return to work outcomes between alternative and traditional workers' compensation programs

Katherine Schofield PhD[1] | Andrew D. Ryan MS[2] | Kim N. Dauner PhD[3]

[1]Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, Duluth, Minnesota
[2]Department of Environmental Health Sciences, University of Minnesota, Minneapolis, Minnesota
[3]Department of Economics and Health Care Management, University of Minnesota Duluth, Duluth, Minnesota

Correspondence
Katherine Schofield, PhD, Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, 237 Voss Kovach Hall, 1305 Ordean Court, Duluth, MN 55812-3000.
Email: kscho@d.umn.edu

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Abstract

Background: The Union Construction Workers' Compensation Program (UCWCP) was developed in 1996 as an alternative workers' compensation arrangement. The program includes use of a preapproved medical and rehabilitation network and alternative dispute resolution (ADR), and prioritizes a quick and safe return-to-work. The aim of this study is to determine if differences in recovery-related outcomes exist between UCWCP and the statutory workers' compensation system (SWCS).

Methods: Claims data from 2003 to 2016 were classified as processed through UCWCP or SWCS. Outcomes included: temporary total disability (TTD), vocational rehabilitation (VR), claim duration and costs, and permanent partial disability (PPD). The relative risk of incurring TTD, VR, and PPD in UCWCP vs SWCS was calculated using log-binomial regression. Linear regression examined the relationship between programs and continuous outcomes including costs and duration. Estimates were adjusted for age, sex, wage, and severity.

Results: The UCWCP processed 15.8% of claims; higher percentages of UCWCP claimants were older and earned higher wages. Results point to positive findings of decreased TTD incidence and cost, lower risk of TTD extending over time, higher likelihood of VR participation, and less attorney involvement and stipulation agreements associated with UCWCP membership. Differences were more apparent in workers who suffered permanent physical impairment.

Conclusion: Findings suggest that the defining programmatic elements of the UCWCP, including its medical provider and rehabilitation network and access to ADR, have been successful in their aims. Claims with increased severity exhibited more pronounced differences vs SWCS, potentially due, in part, to greater use of programmatic elements.

KEYWORDS
construction workforce, disability evaluation, occupational injury, union collective bargaining, workers' compensation

1 | INTRODUCTION

Across the United States, workers' compensation (WC) policy presents a dynamic landscape. Each state independently administers its own laws and statutes which may vary widely from state-to-state. Changes to WC systems or programs generally aim to make delivery more cost-effective, efficient, flexible, and less litigious. However, when injury compensation and payments are reduced or employee outcomes are not considered in the process, costs to the injured employee are high and may be prolonged.[1] In addition to the direct

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burden on the employee, a workplace injury can shift the cost of injury from the WC system to private insurance or union healthcare funds to pay for medical costs, or to state or federal benefits systems for medical expenses, long-term care, and as a supplement for lost wages.[1,2] This can prolong injury recovery time, or worse, create long-term disability and lost employment capacity,[3,4] plus create organizational consequences at the worksite and for the employer.

The risk of severe and disabling injury[5,6] creates unique WC needs for the construction workforce and stakeholders, and alternative WC systems have been developed in many states in response to needs and interests. These systems are referred to as carve-outs, alternative dispute resolution (ADR) systems or collectively-bargained WC agreements and are alternatives to statutory state WC systems, but still subject to statues and state oversight; they currently exist for WC purposes in 12 states.[7] Labor unions and insurance entities may partner in alternative system development; program participation is usually voluntary, at the discretion of the employer or union. Employers, unions, insurers, and injured employees all may report a greater feeling of control, ownership, or representation in the process.[7] Stakeholders form carve-outs based on unique industry needs, with the goals to prevent long-term disability and improve worker outcomes while remaining cost-effective for all, via methods that are different than in statutory workers' compensation systems (SWCS). Programs may achieve this through varying degrees of industry partnership, efficiency in the claims process, quality medical care, and ADR. Minnesota's Union Construction Workers' Compensation Program (UCWCP) was founded in 1996 and developed in cooperation with construction union collective-bargaining agreements. In its published mission, the UCWCP states its goals to *eliminate the adversarial WC culture; provide access to medical and rehabilitation providers using the most effective treatment protocols; ensure payment of worker benefits without delay; create a prompt and safe return-to-union-work, wages, and benefits to minimize financial losses to injured employees, contractors, and insurers; and reduce WC insurance costs for union contractors*[8]

UCWCP participation is determined by multiple parties; unions collectively bargain for the option in their contracts (30+ construction-related locals and trades represented in this study), sponsoring insurance providers (39 represented in this study) recognize the program and adjudicate claims accordingly, and union construction establishments decide (annually) whether or not to become members or maintain membership. There is no individual worker choice in the determination of UCWCP membership. The hallmark components of UCWCP include an exclusive provider network for medical care, an independent medical examiner (IME) panel for medical opinions to solve disputes, an exclusive qualified rehabilitation consultant (QRC) network to assist in returning injured employees to work, and access to an ADR process with mediators and arbitrators vs the statutory Minnesota state legal system. Medical provider networks and hands-on claims management have been shown to be effective in reducing costs and improving outcomes in WC research.[9-12] Further, ADR may be more participatory for those involved and provide more timely resolutions and personalized remedies.[7,13] A Minnesota Department of Labor and Industry (MNDLI) memo[14] in 2007 examined UCWCP and reported that it worked from a program delivery standpoint; there were noticeable cost-savings for program participants vs the construction industry as a whole in Minnesota and a greater likelihood for employees to return-to-work. A report[15] by Minnesota's Office of the Legislative Auditor (2009) noted that the UCWCP ADR was simpler and required fewer steps than ADR in the state system. Analysis of carve-out programs in other states such as Maryland,[13] New York,[16] and California[17] indicated generally positive feedback about programs from employees and employers, with varying degrees of benefits and cost savings. California's analysis[17] used control groups, while others presented case studies. However, our research focused on comparative claim outcomes and the goal of this study was to examine injury severity and recovery outcomes in the UCWCP program vs the SWCS.

2 | METHODS

2.1 | Claim classification and selection

WC claim data for the period of 2003 to 2016 were obtained from MNDLI state WC system database, which is derived from first reports of injury and coded by MNDLI. This dataset included a population of construction employees who had lost-time (LT) injury claims (>3 calendar days away from work and/or wage-loss payments); LT claims are generally more severe, complex, and costly than medical-only claims. Claims were either processed through UCWCP or the SWCS. Membership in UCWCP was determined in the dataset via cross-reference with the UCWCP membership database for each claim.

A comparison group of SWCS claims was created from all claims in the database by narrowing the SWCS claims to only those managed by a participating insurance provider that also managed UCWCP claims. In addition, the SWCS comparison claims were further narrowed to include only the 58 North American Industry Classification System (NAICS) codes represented by the UCWCP claims. For both the UCWCP and SWCS claims, all residential and home building NAICS codes were removed because the majority of UCWCP members engage in commercial work and disproportionally large numbers of SWCS claims were in residential work. SWCS claims included both union and non-union workers. We excluded denied claims or claims where the employee was deceased. The data were determined to have exempt status by a human subjects institutional review committee.

2.2 | Claim costs and outcomes

Each claim included the date of injury, information on employee age, wage, sex, marital status, and job tenure; Occupational Injury and Illness Classification System codes for injury characteristics of body part and nature; and claim costs, disability levels, durations, and outcome-related measures. This information was used to measure

the outcomes and severity of each claim and UCWCP efficacy. Disability definitions are fairly standard across states, however, payment levels vary. Definitions of important variables include the following:

- *Temporary Partial Disability (TPD)*: A disability status assigned when an employee is able to return to work but suffers a wage loss and is earning less than their preinjury wage. TPD is subject to a maximum duration (225 weeks). TPD costs include wage-loss payment at 2/3 the difference between preinjury and postinjury earnings and are untaxed.
- *Temporary Total Disability (TTD)*: A disability status assigned when an employee is totally unable to work due to a work injury or, less commonly, is released to work with restrictions that cannot be accommodated by the employer. TTD duration is the length of time that an employee who is totally unable to work due to injury receives lost wage payments, subject to a maximum duration (130 weeks). Most employees recover and return to work, at which point, TTD ends. TTD duration was measured in categories used in MNDLI SWCS reporting: less than 3 months (low-13 weeks), 3 to less than 6 months (>13-26.1 weeks), 6 to less than 12 months (>26.1-52.2 weeks), more than 12 months (>52.2 weeks). TTD costs include wage-loss payment paid to an employee who is totally unable to work. These are paid at 2/3 the employee's average weekly wage, subject to a minimum and maximum ($130, $750-1046), and are untaxed. Wage loss payments begin after 3 days of lost work time, and after 10 or more days of lost work time, the worker may recoup the first 3 days of unpaid lost wages.
- *Permanent Partial Disability (PPD)*: A disability classification that occurs when a worker does not fully recover from their injury and has a permanent functional loss of the body. It can be classified in addition to, or absence of, other disability classifications. Only a minority of claims (<35%) are classified as having PPD. PPD is a clinical measure rated by a medical professional as a percentage (%) of permanent disability to the whole body and paid weekly or in a lump sum amount set by state statutes based on percentage.[18] PPD payments are not related to a worker's wage or ability to work. The PPD evaluation and rating are typically done when the employee has reached maximum medical improvement. A PPD classification does not preclude an employee from returning to a preinjury job or full preinjury wages. PPD is absent when a worker has fully recovered and present when a worker has a degree of permanent physical impairment.
- *Vocational Rehabilitation (VR)*: Injured workers' who cannot easily return-to-work have the opportunity for VR services. Workers may need assistance returning to work because of the severity of a work-related injury and/or their employer is unable to offer suitable gainful employment within their work restrictions.[19] VR can begin at any time, although usually not considered until a few months after injury, unless immediately apparent due to injury severity that the worker needs to enter VR sooner. VR is usually associated with higher injury severity and disability. Rehabilitation is designed to restore the injured worker to their previous job or one similar, and keep their economic status as close as possible to preinjury status. VR outcomes were categorized within the data as enrollment in VR; return to the same employer; return to the different employer; no return. No return to work after VR enrollment can be due to any of the following reasons: closures due to decisions (mediation/stipulation), orders (judge/commissioner), agreement of parties, inability to locate the employee, death of the employee, or QRC withdrawal.
- *Claim Duration and Costs*: Duration is the length of time from date of injury to claim closure. In this study, closure is not a measure of promptness of benefit payment or medical decision, nor does it measure a count of days away from work, which was not contained in the data. Rather, closure can occur when the injured employee has reached maximum medical improvement, all payments have been made, there is no current activity on the file, and/or a settlement is reached. Claims can be reopened, if necessary, for additional lost-wage and benefit payments; future medical payments and care can be disbursed, if necessary, without reopening a claim. Occasionally, terms of a settlement may prevent aspects of a claim from being reopened. Claim cost values represent total dollars of indemnity, VR (if applicable), stipulation agreement (if applicable), and attorney fees recovered (if applicable) paid for the claim. Medical costs were not available and not included in the total. Reserves were not included in the data. A 2% annual inflation factor was applied to claim costs to bring them on-level with the most recent years' costs in the dataset. When study data were collected (June 2017), a small number of claims was still classified as open, 2.8% (92) of UCWCP claims and 2.0% (354) of SWCS claims. All open claims had developed at least 6 months past the date of injury; no further claim development factors were applied. Distributions of claim costs, claim duration, and PPD percentage were highly skewed to the right, a common attribute of WC data. These variables were transformed using the natural log to more closely approximate a normal distribution.
- *Stipulation agreement*: An agreement in which an employee may give up the right to past or future WC benefits or payments in exchange for a specific amount of money. They often occur when parties dispute aspects of the claim, such as benefits or disability status.[20] In some cases, when there is a dispute about the presence or magnitude of permanent impairment, a settlement agreement is reached and PPD is paid (fully or in part) through a stipulated agreement; if there is no PPD percentage reported to MNDLI, these instances are not counted as PPD cases.
- *Attorney involvement*: Attorneys may become involved in a WC claim when it is more severe, complex, adversarial, and/or when the injured employee feels they need expert representation to resolve their claim. In certain circumstances, attorney fees may be partially reimbursed as a part of total paid claim costs when an employer/insurer unsuccessfully disputes a claim against an injured employee.

2.3 | Analysis

Descriptive analyses included frequencies of the employee (sex, age, wage, tenure, and marital status), injury (body part, nature), and

outcome (TTD, VR, PPD, stipulation agreement, and attorney fee) characteristics based on UCWCP and SWCS status. The χ^2 test was performed on the categorical variables to determine differences in percentages between UCWCP and SWCS. Distributions of wage were calculated (mean, standard deviation [SD], and 95% confidence intervals [CI]), and the difference in means between UCWCP and SWCS was determined using an independent *t* test.

The relative risk (RR) and 95% CI of incurring a binary outcome in UCWCP vs SWCS were calculated through multivariate analysis using log-binomial regression. Binary outcomes included: TTD outcomes (any TTD, TTD >3 months, TTD >6 months, and TTD >12 months); VR outcomes (enrollment in VR, return to same employer, and return to any employer); PPD rating (yes/no); attorney involvement (yes/no); stipulation agreement (yes/no). Multivariate analysis was also used to calculate ratios of the mean (RoM) and 95% CIs of log-transformed variables for claim costs, claim durations, and PPD percentage for UCWCP compared with SWCS claims through linear regression models. General estimating equations accounted for correlation within employers for all models; the autoregressive matrix was selected, assuming claims more proximate were more closely correlated.

Age and sex were included in multivariate models based upon their association with UCWCP claims and recovery related outcomes[21] and because of their differential distribution in the UCWCP and SWCS claims. The wage was selected for model inclusion because of its differential distribution in the UCWCP and SWCS populations and its basis as the foundation for most cost-related outcomes. Also, baseline injury severity was an important consideration for recovery-related outcomes.[21] The data did not include an explicit measure of injury severity; as a proxy, PPD was included in some multivariate models. PPD was distributed differently in the UCWCP and SWCS claims and provided a clinical rating metric. All estimates were adjusted for age, sex, and wage. With the exception of PPD-related estimates, all models were also adjusted for PPD rating.

In separate analyses, we stratified based on those who had a lasting physical impairment (PPD% >0) to examine the association between PPD and select outcomes (TTD, attorney, stipulation, the total duration of all claims, and costs) within just the strata of employees who had more severe injuries. All PPD related outcomes were excluded for this analysis; VR enrollment/outcomes/duration were also excluded from the stratified analysis because physical impairment and disability are already primary inclusion factors for enrollment.

3 | RESULTS

3.1 | Descriptive statistics

A total of 20 670 WC claims (3260 in UCWCP; 17,410 in SWCS) were analyzed; over 350 union employers used the UCWCP over the course of the study period. Distributions of all worker, injury, and claim characteristics differed between the populations, most notably in age and wage, where UCWCP workers were significantly older and significantly higher paid than their SWCS counterparts (Table 1). Mean weekly wage was significantly different between groups ($P < .0001$); UCWCP workers had a mean wage of $1246 (SD $366, 95% CI $1233-1259) vs $914 (SD $390, 95% CI $908-920) in the SWCS. The distribution of recovery outcomes also differed between the UCWCP workers and SWCS workers; UCWCP claims had a slightly greater percent of TPD, less incidence of TTD, but the greater frequency of VR enrollment and PPD ratings on their claims vs SWCS workers (Table 2).

3.2 | Multivariate analysis

When examining all claims, and controlling for age, wage, sex, and PPD, UCWCP workers exhibited a 3% significantly reduced risk of overall TTD incidence, as well as significantly lower risk of TTD extending past 3-month (10% lower), 6-month (14% lower), and 12-month (16% lower) duration checkpoints compared with SWCS workers (Table 3). Looking just at the population of workers with eventual permanent physical impairment, UCWCP workers' risk of any TTD, and risk of TTD extending beyond 3 and 6 months all saw significant reductions of 5%, 10%, and 17% respectively, as compared with the SWCS workers (Table 3). Risk of TTD extending past 12 months was also reduced, though not significantly. UCWCP, vs SWCS workers, also exhibited a lower risk of TPD wage loss for all claims (RR = 0.96; 95% CI = 0.86-1.06), and PPD claims ((RR = 0.91; 95% CI = 0.82-1.01) though the difference was not significant (Table 3).

In the entire claims population, UCWCP workers had a 10% significantly higher likelihood of VR enrollment (RR = 1.10; 95% CI = 1.04-1.16), and similar likelihood to return to their previous employer, or to any employer (same/different) as their SWCS counterparts (after controlling for age, wage, sex, and PPD) (Table 3).

UCWCP claims exhibited slightly lower levels of stipulation agreements and attorney involvement in comparison with SWCS claims, though not significantly. However, among permanent impairment claims, the risk of having a stipulation agreement (RR = 0.81; 95% CI = 0.68-0.96) and attorney involvement (RR = 0.83; 95% CI = 0.71-0.98) was significantly reduced in UCWCP vs SWCS (Table 3).

Lasting physical impairment after recovery is recognized by the WC system through a PPD rating. UCWCP workers exhibited an 8% significantly higher risk of a PPD rating than workers in the SWCS system (Table 3). However, amongst the population of workers with a PPD rating, UCWCP workers had a lower PPD percent than SWCS workers (RR = 0.96; CI = 0.92-1.00); UCWCP PPD payments, which go hand-in-hand with rating percent, had a slightly lower cost trend, though were fairly equal to SWCS payments (Table 4).

The mean duration of all UCWCP claims, controlling for age, wage, sex, and PPD, was shown to be approximately 3% longer than all SWCS claims (RR = 1.03; 95% CI = 1.02-1.05); when examined among claims of workers with permanent impairment, the association actually reversed, with UCWCP claims to see a slight decrease in mean duration, relative to SWCS, but this was not statistically significant (Table 4).

TABLE 1 Injured worker and claim characteristics

	UCWCP		SWCS		
	N	%	N	%	χ^2 (df), *P* value
Total claims	3260	15.8	17 410	84.2	
Sex					8.27 (2), .016
Female	93	2.9	416	2.4	
Male	3147	96.5	16 936	97.3	
Missing	20	0.6	58	0.3	
Age					375.42 (6), <.0001
14-24	164	5.0	2184	12.5	
25-34	591	18.1	4583	26.3	
35-44	878	26.9	4289	24.6	
45-54	1068	32.8	4035	23.2	
55-64	467	14.3	1724	9.9	
65+	14	0.4	149	0.9	
Missing	78	2.4	446	2.6	
Wage					2009.18 (5), <.0001
<$500	64	2.0	2080	12.0	
$500-<750	162	5.0	4355	25.0	
$750 -<1000	394	12.1	3753	21.6	
$1000-<1250	1035	31.8	3704	21.3	
≥$1250	1497	45.9	3097	17.8	
Missing	108	3.3	421	2.4	
Tenure					107.31 (4), <.0001
<3 mo	526	16.1	2772	15.9	
3-11 mo	437	13.4	2846	16.3	
1-5 y	777	23.8	4605	26.5	
>5 y	1147	35.2	4676	26.9	
Missing	373	11.4	2511	14.4	
Marital status					57.76 (2), <.0001
Married	1657	50.8	8204	47.1	
Not married	1284	39.4	7961	45.7	
Missing	319	9.8	1245	7.2	
Body part					36.43 (7) <.0001
Head/neck	114	3.5	850	4.9	
Trunk/internal organs	471	14.4	2300	13.2	
Upper extremity	881	27.0	4437	25.5	
Lower extremity	847	26.0	4458	25.6	
Back	619	19.0	3404	19.6	
Multiple parts	287	8.8	1679	9.6	
Other parts	14	0.4	191	1.1	
Missing	27	0.8	91	0.5	
Injury nature					107.31 (13) <.0001
Burn	44	1.3	245	1.4	
Surface wounds/ bruises	160	4.9	993	5.7	
Open wounds	233	7.1	1700	9.8	
Dislocations	59	1.8	252	1.4	
Fracture	245	7.5	1682	9.7	
Sprains	1302	39.9	6353	36.5	
Cumulative disorders	65	2.0	338	1.9	
Hernia	81	2.5	427	2.5	
Pain	489	15.0	2095	12.0	
Multiple injuries	96	2.9	635	3.6	
Diseases	29	0.9	232	1.3	
Other injuries/ disorders	236	7.2	1403	8.1	
Unknown	63	1.9	495	2.8	
Missing	158	4.8	560	3.2	

(Continues)

TABLE 1 (Continued)

Abbreviations: SWCS, statutory workers' compensation system; UCWCP, Union Construction Workers' Compensation Program.

Total mean paid costs were approximately equivalent, while mean TTD paid costs displayed a small (6%) downward trend for all UCWCP claims as compared with all SWCS claims, though not significant (Table 4). When we analyzed these claim cost measures just for workers with PPD, both categories were less than SWCS claims; UCWCP total mean paid costs were 2% (RoM = 0.98; 95% CI = 0.97-0.99) significantly lower than SWCS costs, and TTD paid mean costs were 21% (RoM = 0.79; 95% CI = 0.68-0.92) significantly lower than the SWCS (Table 4).

4 | DISCUSSION

Our findings point to several benefits associated with UCWCP's handling of construction WC claims. Most notably, significantly decreased TTD incidence and lower risk of TTD extending over time. Also reduced TTD costs, higher likelihood of VR participation and less attorney involvement and stipulation settlement agreements were associated with UCWCP membership. These findings suggest that the defining programmatic elements of the UCWCP including its exclusive provider network for medical care, IME panel, exclusive rehabilitation consultant network, and access to ADR have been successful in their aims. While other studies focused on payroll-based and dispute resolution outcomes, or qualitative participant feedback, our study has been the first to focus on claims-based recovery outcomes, comparing the multitrade UCWCP carve-out population with a similar noncarve-out population in the SWCS over time, adding additional evidence-based knowledge to the existing literature.

Our findings are similar to studies of carve-out programs in other states. A study of Maryland's carve-out program indicated lower probabilities of disability payments and less attorney involvement.[13] A New York program reported high ratings from participating employees for dispute resolution and positive reviews from employers for lower medical costs[16]; both groups noted they were generally pleased with their experiences. This program included a medical network, ADR, and focus on return-to-work. However, this study was limited because it used a case study design with only one

TABLE 2 Frequencies of claim outcomes

	UCWCP		SWCS		
	N	%	N	%	χ^2 (df), *P* value
Total claims	3 260	15.8	17 410	84.2	
Temporary partial disability					0.21 (1), .65
0	2 411	74.0	12 942	74.3	
>0	849	26.0	4 468	25.7	
Temporary total disability					18.0 (4), .0012
0	522	16.0	2 395	13.8	
>0-<3 mo	1 967	60.3	11 115	63.8	
3-<6 mo	322	9.9	1 567	9.0	
6-<12 mo	207	6.4	1 106	6.4	
12+ mo	242	7.4	1 227	7.0	
Vocational rehabilitation					80.64 (5), <.0001
Enrolled	1 060	32.5	4 602	26.4	
Return same employer	421	39.7	1 683	36.6	
Return different employer	166	15.7	953	20.7	
Program not complete/no return	384	36.2	1 622	35.2	
Program in-progress	89	8.4	344	7.5	
Permanent partial disability rating					96.00 (5), <.0001
0	2 142	65.7	12 827	73.7	
>0-<5%	643	19.7	2 443	14.0	
5-<10%	254	7.8	1 142	6.6	
10-<15%	156	4.8	671	3.9	
15-<20%	33	1.0	169	1.0	
20+ %	32	1.0	158	0.9	
Stipulation agreement					2.16 (1), .1421
Yes	591	18.1	2 972	17.1	
No	2 669	81.9	14 438	82.9	
Attorney					0.54 (2), .7636
Yes	502	15.4	2 618	15.0	
No	2 757	84.6	14 789	85.0	
Missing	1	0.0	3	0.0	
Open claims (as of 6/2017)	92	2.8	354	2.0	
Denied claims	393	10.76*	2 108	10.80*	

Abbreviations: SWCS, statutory workers' compensation system; UCWCP, Union Construction Workers' Compensation Program.
*calculated as the percentage of approved + denied UCWCP N = 3 653, SWCS N = 19 518.

organization representing only one trade for a carve-out group, whereas our study was a retrospective analysis of a population of all construction trades and included both claims that were processed through the carve-out and under the SWCS for comparison. Levine et al (2002)[17] extensively reported on a number of California construction carve-out programs including costs, injury rates, worker and employer feedback, and the dispute resolution process. Qualitative feedback appeared positive. Reduced total costs and PPD claims per $1million exposure over time were indicated but were not significantly different than the differences control groups exhibited over time. Also, mean TTD duration did not exhibit significant differences between groups, which differs from our results. Within Minnesota, a DLI report[14] (2007) found that the UCWCP members pay significantly less and have a shorter duration of indemnity, which generally agrees with our results, yet, the MN DLI memo described much more pronounced results of the program as compared with our evaluation, with reductions in costs around 40% per $1 million payroll. However, MN DLI analysis used a different dataset, which included medical costs and payroll, and a smaller subset of the UCWCP population compared with overall construction data in Minnesota, whereas our study compared claim-level recovery outcomes in UCWCP vs the SWCS. Differences in results could also be explained in that the MN DLI evaluation did not adjust for age, sex, or wage, which differed significantly between the UCWP and SWCS. When using payroll as a denominator, higher wages, or lower, in the underlying population could influence rates even between worker groups with similar time-at-risk.

Alternative WC programs utilize various elements that have been shown to be evidence-based in occupational medicine literature. Injured UCWCP workers may choose their own provider from the network of over 450 medical providers and must seek treatment within that system. Providers are selected to create a comprehensive acute injury, primary, and specialist network with occupational medicine and WC expertise. Other studies of preferred provider networks with WC expertise have

TABLE 3 Association between workers' compensation program and claim outcomes

	All claims			Permanent impairment claims[a]		
	RR[b]	95% CI		RR[d]	95% CI	
Temporary partial disability						
UCWCP	0.96	0.86	1.06	0.91	0.82	1.01
SWCS	1.0			1.0		
Temporary total disability (TTD)						
Any TTD						
UCWCP	0.97	0.95	0.99	0.95	0.92	0.98
SWCS	1.00			1.0		
Extending >3 mo						
UCWCP	0.90	0.84	0.96	0.90	0.83	0.99
SWCS	1.00			1.0		
Extending >6 mo						
UCWCP	0.86	0.78	0.96	0.83	0.73	0.96
SWCS	1.0			1.0		
Extending >12 mo						
UCWCP	0.84	0.73	0.98	0.82	0.67	1.00
SWCS	1.0			1.0		
Vocational rehabilitation						
Enrollment						
UCWCP	1.10	1.04	1.16	N/A		
SWCS	1.0					
Return to same employer						
UCWCP	1.01	0.91	1.12	N/A		
SWCS	1.0					
Return to any employer						
UCWCP	1.02	0.93	1.12	N/A		
SWCS	1.0					
Permanent partial disability						
UCWCP	1.08[c]	1.01	1.17	N/A		
SWCS	1.0					
Stipulation agreement award						
UCWCP	0.99	0.89	1.09	0.81	0.68	0.96
SWCS	1.0			1.0		
Attorney						
UCWCP	0.95	0.86	1.05	0.83	0.71	0.98
SWCS	1.0			1.0		

Abbreviations: CI, confidence intervals; RR, relative risk; SWCS, Statutory Workers' Compensation System; UCWCP, Union Construction Workers' Compensation Program.
[a]Stratified by permanent partial disability (PPD) where PPD rating >0.
[b]Adjusted for age, sex, wage, PPD percent, and within-employer correlation.
[c]PPD cost and percent are measured as an outcome; PPD% excluded from the model.
[d]Adjusted for age, sex, wage, and within-employer correlation.

also demonstrated success in reducing costs and days away from work.[9-12] Expedited care is a notable component of the network and UCWCP providers agree to see UCWCP workers within 24 hours of injury. Prompt postinjury care has been shown to reduce the risk of long-term disability.[10,22-24] Occupational-focused medicine recognizes and promotes return-to-work options during recovery, even if the worker has physical impairment or restrictions.[10,25,26] Also, communication between providers, employers, and workers plays a vital role in return-

TABLE 4 Comparing claim costs and time-based outcomes between workers' compensation programs

	All claims			Permanent impairment claims[a]		
	RoM[b]	95% CI		RoM[c]	95% CI	
Duration						
Total claim duration						
UCWCP	1.03	1.02	1.05	0.99	0.98	1.00
SWCP	1.00			1.00		
Costs*						
Total paid**						
UCWCP	1.00	0.98	1.03	0.98	0.97	0.99
SWCS	1.00			1.00		
Temporary total disability paid						
UCWCP	0.94	0.87	1.03	0.79	0.68	0.92
SWCS	1.00			1.00		
Permanent partial disability paid						
UCWCP	N/A			0.99[c]	0.98	1.00
SWCS				1.00		
Permanent partial disability rating %						
UCWCP	N/A			0.96[c]	0.92	1.00
SWCS				1.00		

Abbreviations: CI, confidence intervals; RoM, ratios of the mean; SWCS, statutory workers' compensation system; UCWCP, Union Construction Workers' Compensation Program.

[a]Stratified by permanent partial disability (PPD) where PPD rating >0.

[b]Adjusted for age, sex, wage, PPD%, and within-employer correlation.

[c]Adjusted for age, sex, wage, and within-employer correlation.

*Data are valued as of June 2017.

**includes indemnity costs (no medical) and PPD/stipulation/VR/attorney fee reimbursement, if applicable.

to-work.[25,27,28] All UCWCP network providers are required to provide a written diagnosis and detailed work restrictions to all involved parties within 24 hours of treatment. Releasing an employee to work, even in a reduced physical capacity during recovery, reduces the occurrence, duration, and costs of TTD and TPD, which is indicated in our results for UCWCP workers.

Interestingly, our findings hold up, despite some differences between the UCWCP and SWCS population that might reduce our ability to detect differences in the program. The UCWCP worker population was higher paid, older and had differential distributions of lasting permanent impairment, body part injured and nature of the injury, which has been showed to increase time to return to work.[21,22,24,29] Maintaining the boundaries of trade-specific work can potentially create challenges for early return-to-work in a union environment. Union establishments need to be mindful when returning an employee with work restrictions so modified duties or tasks do not cross into the bargaining unit work of other trades. For example, an electrician cannot return and take laborers to work; a laborer cannot take equipment operators to work, etc. In light of this, the UCWCP still illustrated significantly reduced TTD risk, which may be a testament to the medical network and communication between parties. Also, union workers generally exhibit higher levels of injury reporting than nonunion workers, up to 5.7 times more likely to report both low and high severity musculoskeletal disorders in some reports,[30] which has been attributed to work and organizational factors.[31-33] Differential underreporting is an important consideration [34-36] and injury risk for union workers may appear to be elevated in comparison with nonunion workers. Finally, while injured UCWCP workers seek treatment within the medical network, those in-network providers do not have restrictions and can treat workers from the SWCS population. Therefore, it is possible for SWCS workers and employers to gain the benefits of the exclusive network without UCWCP membership. This too would bias our study results in the direction of not finding an effect.

We found that UCWCP workers were enrolled in VR at a significantly higher rate, which differed from the 2007 report,[14] though this did not appear to create increased mean claim costs or TTD durations for UCWCP vs SWCS. Differences in enrollment rate could be explained by the proactive enrollment of potential candidates into VR facilitated by the UCWCP's rehabilitation professionals, worker requests for rehabilitation stemming from personalized UCWCP ADR outcomes, and/or economic climate.[37] UCWCP workers who enrolled in the VR program had an almost equal likelihood of return to their employer, or the workforce in general, as their SWCS counterparts, with no significant difference between the two groups detected. In addition to, or in spite of, UCWCP programmatic elements, the literature suggests that underlying injury severity, age, physical ability, baseline education, and employee goals and psychosocial factors all influence the probability of a successful VR outcome.[21,25,38,39]

Claim severity is an important consideration which we adjusted for through the PPD rating. We found that while UCWCP workers had a higher risk of receiving a PPD rating than workers in the SWCS system, they had a lower overall PPD % and equal PPD costs. However, PPD is only assigned to a minority of claims and is assessed at claim completion, so is not helpful as a prognostic measure of efficacy. Also, PPD benefits paid through the stipulated agreement are not recorded as PPD in the MNDLI system, thus increased incidence of claim dispute and settlement may mute the appearance of workers suffering PPD. In addition, we were limited with our dataset to LT claims only and do not know the total underlying claim population. We had to assume that claims had similar characteristics and ultimate recovery likelihood in both UCWCP and SWCS. Higher baseline severity of UCWCP claims entering the MNDLI dataset could mute results of program efficacy compared with the SWCS; conversely, a baseline UCWCP population in the dataset with less comparative claim severity could inflate efficacy. Medical costs were unavailable; the addition of this data to the claims could impact observed total paid cost trends. There is also a large disparity (3260 claims in UCWCP; 17,410 in SWCs) between UCWCP and SWCS in this study, and this has a potential to bias outcomes, particularly measures of the ratio of the mean.[40]

A final caveat is that while our study carefully selected a comparison population of SWCS claims, there may be factors that could not be accounted for by our methods alone. It is possible that information on injured persons not available through claims data could impact findings, such as an injured worker's coping strategies and their expectation of

recovery, as well as workplace factors, like their belief the employer will support them and their return-to-work efforts.[25,38] Physical impairment does not directly measure disability, nor the employee's ability to return to their previous work.[41,42] Employee beliefs that they can maintain their physical and social routine during their injury is also linked to return to work outcomes,[25] and relatedly, returning an employee to work, even in a modified capacity, may reinforce these beliefs. Future research on carve-outs could aim to collect psychosocial data from employees matched to claims.

A limitation of our study is external validity. The UCWCP program is specific to the state of Minnesota, and similar programs would most likely be bound by their state WC statutes as well. The programmatic elements of the UCWCP are delivered through insurance providers, and claim management techniques and effectiveness may vary between providers, thus affecting UCWCP efficacy. Knowledge and understanding of carve-out programmatic elements undoubtedly play a role in insurance provider practices. Insurance providers with state-specific presence, expertise, or market-share may make more natural partners for carve-out programs and use of associated programmatic elements and medical provider networks.

5 | CONCLUSION

The results of this study contribute to the understanding of the effectiveness of alternative WC programs which may have increasing use and need in established industry groups or in a changing national job market. Our study provided a robust comparison of claim level outcomes in a cohort of UCWCP claimants matched with similar workers in the SWCS over the course of 13 years. It encompassed all construction trades and their workforce with collectively-bargained agreements and included hundred of employer establishments. The UCWCP appears to contribute to lower severity and disability and greater preferred outcomes for a number of WC claim metrics. The UCWCP also appears to coincide with some cost-savings and lower-attorney involvement. It provides evidence for the use and outcomes of preferred medical providers networks and occupational medicine providers. While UCWCP does appear to increase beneficial outcomes in regard to TTD and among claims with PPD, further work is needed to help understand the effects of UCWCP enrollment on medical costs, the outcomes of lower severity claims, PPD vs stipulated agreements, as well as the perception and satisfaction of the worker and other stakeholders.

State-based statutory WC systems may not be a one-size-fits-all approach to postinjury care and recovery to minimize lasting disability and injury impact. Certain industry groups and stakeholders may feel they could be better served by the WC system; construction has stressed this point, but other industries could tailor programs to their particular needs. Unions seem to be well-suited partners in establishment of carve-outs. Evidence of the ability to create quality and effective alternative WC programs that are also cost-effective can greatly influence state WC policy across the United States. Evidence of more positive injury outcomes, when treated within preferred and occupational specialty networks, may also influence WC policy and treatment parameters for injured workers. While the magnitude of positive effects and cost savings may be small in some cases, the UCWCP program interacts with many in a sizable population, including multiple workers within single employers, which creates a large impact for stakeholders overall.

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CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests.

DISCLOSURE BY EDITOR OF RECORD

John D. Meyer declares that he has no conflict of interest in the review and publication decision regarding this article.

AUTHOR CONTRIBUTIONS

Katherine Schofield participated in the conception and design of the work. She acquired, analyzed, and interpreted the data. She was involved in the drafting and revision of the work and final approval of revisions. She agrees to be accountable for all aspects of the work. Andrew Ryan was involved in the design of the project and analysis of the data and subsequent interpretation. He assisted with drafting and revising the work, final approval for revisions, and agrees to be responsible for all aspects of the work. Kim Nichols Dauner participated in the design of the work, interpretation of the data, drafting, and revision of the work, final approval for revisions, and agrees to be responsible for all aspects of the work.

INSTITUTIONAL AND ETHICAL APPROVAL AND INFORMED CONSENT

Human Subjects Committee of the University of Minnesota Institutional Review Board (IRB) determined that the referenced study (#1605E87423) is exempt from review under federal guidelines 45 CFR Part 46.101 (b) category #4 Existing Data; Records Review; Pathological Specimens. Verbal and/or written informed consent was not needed for review of existing data and records.

ORCID

Katherine Schofield http://orcid.org/0000-0001-8561-9379

REFERENCES

1. Michaels D Adding inequality to injury: the costs of failing to protect workers on the job. Occupational Safety & Health Administration, US Department of Labor. Washington DC. 2015. (http://www.dol.gov/osha/report/20150304-inequality.pdf, Accessed on 8 February 2016).
2. Leigh JP, Robbins JA. Occupational disease and workers' compensation: coverage, costs, and consequences. *Milbank Q*. 2004;82(4):689-721.
3. Dong XS, Wang X, Largay JA, Sokas R. Long-term health outcomes of work-related injuries among construction workers—findings from the National Longitudinal Survey of Youth. *Am J Ind Med*. 2015;58(3):308-318.
4. Park RM, Bhattacharya A. Uncompensated consequences of workplace injuries and illness: long-term disability and early termination. *J Saf Res*. 2013;44:119-124.
5. Courtney TK, Matz S, Webster BS. Disabling occupational injury in the US construction industry, 1996. *J Occup Environ Med*. 2002;44(12):1161-1168.
6. Dement JM. Workers' compensation experience of North Carolina residential construction workers, 1986-1994. *Appl Occup Environ Hyg*. 1999;14(2):97-106.
7. Kotler FB. *Alternative Dispute Resolution [ADR] for Workers Compensation in Collective Bargaining Agreements: An Overview*. Ithaca, NY: Cornell University; 2012.
8. Union Construction Workers' Compensation Program (UCWCP) 2019. http://www.ucwcp.com/Default_ucwcp.aspx, Accessed April 15, 2019.
9. Green-McKenzie J, Parkerson J, Bernacki E. Comparison of workers' compensation costs for two cohorts of injured workers before and after the introduction of managed care. *J Occup Environ Med*. 1998;40(6):568-572.
10. Bernacki EJ, Tsai SP. Ten years' experience using an integrated workers' compensation management system to control workers' compensation costs. *J Occup Environ Med*. 2003;45(5):508-516.
11. Linz DH, Ford LF, Nightingale MJ, et al. Care management of work injuries: results of a 1-year pilot outcome assurance program. *J Occup Environ Med*. 2001;43(11):959-968.
12. Lincoln AE, Feuerstein M, Shaw WS, Miller VI. Impact of case manager training on worksite accommodations in workers' compensation claimants with upper extremity disorders. *J Occup Environ Med*. 2002;44(3):237-245.
13. Emerson RD, Minchin RE, Jr, Gruneberg S. Workers' compensation in construction: Workers' Benefits under Alternative Dispute Resolution Systems. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*. 2013;5(3):113-121.
14. Minnesota's Department of Labor and Industry, Research and Statistics Unit, October 2007, Construction Collective Bargaining Agreement Claims and Cost Comparisons http://www.ucwcp.com/docs/DLI%20Report.pdf
15. Minnesota's Office of the Legislative Auditor, February 2009, *Oversight of Worker's Compensation*, [pgs 60-67, 'Comparison to the UCWCP']. http://www.ucwcp.com/docs/Legislative_Auditor_Report_2009.pdf
16. Seeber RL, Schmidle TP, Smith RS An Evaluation of the New York State Workers' Compensation Pilot Program for Alternative Dispute Resolution. 2001
17. Levine DI. *Carve-Outs in Workers' Compensation: An Analysis of the Experience in the California Construction Industry*. Kalamazoo, MI: WE Upjohn Institute for Employment Research ; 2002
18. Minnesota Rules: Minnesota Rules, Chapter 5223; MINN. R. 5223.0000 (2014)
19. Minnesota Rules: Minnesota Rules, Chapter 3300, part 3300.5010; MINN. R. 3300.5010 (2015)
20. Minnesota Department of Labor and Industry. Workers' compensation settlements, 2017. https://www.dli.mn.gov/sites/default/files/pdf/infosheet_settlements.pdf, Accessed April 15, 2019
21. Clay FJ, Fitzharris M, Kerr E, McClure RJ, Watson WL. The association of social functioning, social relationships and the receipt of compensation with time to return to work following unintentional injuries to Victorian workers. *J Occup Rehabil*. 2012;22(3):363-375.
22. Stover B, Wickizer TM, Zimmerman F, Fulton-Kehoe D, Franklin G. Prognostic factors of long-term disability in a workers' compensation system. *J Occup Environ Med*. 2007;49(1):31-40.
23. Kucera KL, Lipscomb HJ, Silverstein B, Cameron W. Predictors of delayed return to work after back injury: a case-control analysis of union carpenters in Washington State. *Am J Ind Med*. 2009;52(11):821-830.
24. Bernacki EJ, Yuspeh L, Tao X. Determinants of escalating costs in low risk workers' compensation claims. *J Occup Environ Med*. 2007;49(7):780-790.
25. Pransky G, Shaw W. Return to work-from research to practice. *J Occup Environ Med*. 2007;49(3):249-251.
26. Loisel P, Abenhaim L, Durand P, et al. A population-based, randomized clinical trial on back pain management. *Spine*. 1997;22(24):2911-2918.
27. Shaw WS, Zaia A, Pransky G, Winters T, Patterson WB. Perceptions of provider communication and patient satisfaction for treatment of acute low back pain. *J Occup Environ Med*. 2005;47(10):1036-1043.
28. Franche RL, Baril R, Shaw W, Nicholas M, Loisel P. Workplace-based return-to-work interventions: optimizing the role of stakeholders in implementation and research. *J Occup Rehabil*. 2005;15(4):525-542.
29. Lowery JT, Borgerding JA, Zhen B, Glazner JE, Bondy J, Kreiss K. Risk factors for injury among construction workers at Denver International Airport. *Am J Ind Med*. 1998;34(2):113-120.
30. Morse T, Punnett L, Warren N, Dillon C, Warren A. The relationship of unions to prevalence and claim filing for work-related upper-extremity musculoskeletal disorders. *Am J Ind Med*. 2003;44(1):83-93.
31. Amick BC, III, Hogg-Johnson S, Latour-Villamil D, Saunders R. Protecting construction worker health and safety in Ontario, Canada: identifying a union safety effect. *J Occup Environ Med* . 2015;57(12):1337-1342.
32. Hoffmann EA. Legal consciousness and dispute resolution: different disputing behavior at two similar taxicab companies. *Law Soc Inq*. 2003;28(3):691-716.
33. Hirsch BT, Macpherson DA, DuMond JM. Workers' compensation recipiency in union and nonunion workplaces. *ILR Review*. 1997;50(2):213-236.
34. Lipscomb HJ, Nolan J, Patterson D, Sticca V, Myers DJ. Safety, incentives, and the reporting of work-related injuries among union carpenters: "You're pretty much screwed if you get hurt at work". *Am J Ind Med*. 2013;56(4):389-399.
35. Boden LI, Ozonoff AL. Capture–recapture estimates of nonfatal workplace injuries and illnesses. *Ann Epidemiol*. 2008;18(6):500-506.
36. Fan ZJ, Bonauto DK, Foley MP, Silverstein BA. Underreporting of work-related injury or illness to workers' compensation: individual and industry factors. *J Occup Environ Med*. 2006;48(9):914-922.
37. Minnesota Department of Labor and Industry. 2016 Minnesota workers' compensation system report, 2018. http://www.doli.state.mn.us/sites/default/files/pdf/wcfact16.pdf, Accessed April 15, 2019
38. Shaw WS, Pransky G, Fitzgerald TE. Early prognosis for low back disability: intervention strategies for health care providers. *Disabil Rehabil*. 2001;23(18):815-828.
39. Schultz IZ, Crook J, Fraser K, Joy PW. Models of diagnosis and rehabilitation in musculoskeletal pain-related occupational disability. *J Occup Rehabil*. 2000;10(4):271-293.
40. Friedrich JO, Adhikari NK, Beyene J. The ratio of means method as an alternative to mean differences for analyzing continuous outcome

variables in meta-analysis: a simulation study. *BMC Med Res Methodol*. 2008;8(1):32.

41. Pransky G, Benjamin K, Hill-Fotouhi C, Fletcher KE, Himmelstein J, Katz JN. Work-related outcomes in occupational low back pain: a multidimensional analysis. *Spine*. 2002;27(8):864-870.
42. Ekman M, Johnell O, Lidgren L. The economic cost of low back pain in Sweden in 2001. *Acta Orthop*. 2005;76(2):275-284.

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