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Safety, Incentives, and the Reporting of Work-Related Injuries Among Union Carpenters: "You're Pretty Much Screwed If You Get Hurt at Work"

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Background *In the high-risk construction industry little is known about the prevalence or effects of programs offering rewards for workers and/or their supervisors for improved safety records or those that punish workers in some way for injury.*

Methods *We conducted an anonymous survey of 1,020 carpenter apprentices in three union training programs to document prevalence of their exposure to such efforts. We explored associations between perceptions of the reporting of work-related injury and elements of these programs.*

Results *Fifty-eight percent (58%; n = 592) reported some safety incentive or negative consequence of work-related injuries on their current jobsite. Reporting of work-related injuries was 50% less prevalent when workers were disciplined for injury experiences. Otherwise, we saw minimal evidence of association between injury reporting practices and safety incentive programs. However, considerable evidence of fear of reprisal for reporting injuries was revealed. Less than half (46.4%) reported that work-related injuries were reported in their current workplace all or most of the time; over 30% said they were almost never or rarely reported.*

Conclusions *There are multiple layers of disincentives to the reporting of work-related injuries that hamper understanding of risk and pose threats to workplace safety and productivity. These pressures do not arise in a vacuum and are likely influenced by a host of contextual factors. Efforts that help us understand variation across jobsites and time could be enlightening; such inquiries may require mixed methodologies and should be framed with consideration for the upper tiers of the public health hierarchy of hazard control.* Am. J. Ind. Med. 56:389–399, 2013.

KEY WORDS: occupational injury; under-reporting; construction workers; safety incentives; public health hierarchy of hazard control; behavioral-based safety; mixed methods

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BACKGROUND

Using incentives to lower injury reporting, as well as punishments or demerits for unsafe activities or injuries, are among efforts that have been used to control injuries in the high-risk construction industry. However, relatively little is known about the prevalence or effects of these programs. The objective of such results-based programs is to entice workers to behave safely. These programs take many forms [Ray et al., 1993, 1997; Al-Hemoud and Al-Asfoor, 2006; Wirth and Sigurdsson, 2008] and are not without controversy.

The approach is rooted in the notion that unsafe behaviors by workers, rather than unsafe work conditions, lead to most work-related injuries. Such efforts have been described as ''victim-blaming,'' and the notion that workers need to be offered incentives to maintain their own safety has also been questioned [Nichols, 1997]. Advocates acknowledge these efforts do not always work, even under good intentions [DePasquale and Geller, 1999; Fell-Carlson, 2004; Geller, 2010], and that ''effective'' programs can potentially mask the true nature of worksite safety through under-reporting of work-related injuries and the leading of workers to seek care outside the workers' compensation system.

Improved surveillance of such programs that includes documentation of their prevalence, worker perceptions and attitudes towards these efforts, as well as actual changes in behavior with regard to safety practices and the reporting of injuries has been called for [Wirth and Sigurdsson, 2008].

METHODS

We conducted an anonymous survey of carpenter apprentices in order to document the prevalence of their exposure to results-based safety programs, to describe the features of programs to which the apprentices were exposed, and to explore relationships between the reporting of work-related injury and specific elements of safety programs such as provision of a variety of incentives or disincentives. Data were collected through three training programs affiliated with the Carpenters District Council of Greater St. Louis and Vicinity and the Chicago Regional Council of Carpenters. The councils train carpenters across a wide spectrum of carpentry work including residential and commercial construction, drywall installation, floorlaying, and millwrighting.

As is typical of apprenticeship training, trainees in these programs participate in school-based skills and safety training several weeks a year while also working for a construction employer where they get additional mentoring and supervision. The St. Louis district council rotates apprentices through the school for 2-week periods twice a year; the Chicago program has apprentices come in for 1 week of training every 12 weeks. Matching the program rotations, recruitment of study participants in St. Louis was every 2 weeks over 6 months and recruitment in Chicago was weekly for 12 weeks.

Members of the research team distributed surveys and provided informed consent information in training classrooms. They explained the study and its voluntary nature. Apprentices were then given time in the classroom to complete the survey anonymously if they chose and all materials were collected in the classroom. In the case of anonymous data collection such as this, the signed consent document becomes the only thing through which participation can be identified. To avoid creating identification of participants when not needed, written informed consent was waived. Consent was ''implied'' by the worker completing the form. Each person had the option to turn in a blank form which would indicate they had chosen not to participate. All procedures were approved through the institutional review boards at Duke University Medical Center and the Center for Construction Research and Training.

Participants were asked to report ever and current exposure to a variety of types of safety programs involving rewards or incentives for safety records as well as repercussions to those who do report injuries, time worked in the carpentry trade, and time with the current employer. We specifically asked about exposure to eight program elements including:

(1) Safety incentive programs that offered cash, prizes or other rewards to *individual workers* for not having an injury.
(2) Safety incentive programs that offered prizes or benefits to *work groups or crews* if the group had low injury reporting.
(3) Safety incentive programs where *supervisors or foremen* received rewards linked to low reports of injury.
(4) Work policies or practices where workers received or were threatened with discipline when they experienced a work-related injury or accident.
(5) Work policies that warned workers they would be disciplined for *not reporting* all injuries.
(6) Work policies requiring injured workers to submit to drug or alcohol testing.
(7) Work policies that gave workers points against them or discipline for ''too many'' days away from work.
(8) Safety observation or coaching programs that focused on workers' ''risky'' or unsafe behaviors as the main cause of workplace injuries.

Apprentices were asked about their own injury experience and their perceptions of coworkers injury reporting practices. Each participant was asked about injury

reporting practices of coworkers at their current worksite and their own comfort in being able to report injuries to their current foreman or supervisor without worrying about how it might affect their job. Finally, an open-ended item gave participants the opportunity to provide comments regarding factors they felt influenced safety on construction jobsites or the reporting of work-related injuries. This final, intentionally broad item was specifically worded, ''Please tell us about any things you think we should be aware of that influence safety on construction jobsites and the reporting of work-related injuries.''

Straightforward descriptive and analytic techniques were used to summarize these data. Prevalence of carpenters working under rewards or disincentives ever or with their current employer was assessed. Associations between individual exposures of such programs and workers' views that they could report injuries to their supervisor without fear of repercussions, as well as injury reporting practices on jobsites were explored. Log-binomial regression was used, instead of logistic regression, to avoid overestimation of prevalence ratios for these relatively common outcomes (>20%) [Skov et al., 1998; Spiegelman and Hertzmark, 2005]. All responses to the final open-ended item were reviewed and summarized.

TABLE I. Apprentice Carpenters Completing Anonymous Classroom Surveys, 2011

	n (%)
Apprenticeship school	
Chicago	307 (30.2)
S Illinois	207 (20.6)
St Louis	503 (49.5)
Time in carpentry	
<6 months	58 (5.7)
6 months to <1 year	52 (5.1)
1 year to <2	109 (10.7)
2 years to <3	113 (11.1)
3 years to <4	155 (15.3)
4 years to <5	138 (13.6)
5 years or more	390 (38.4)
Type work in the last year[a]	
Residential	475 (53.6)
Commercial	611 (59.7)
Millwrighting	108 (10.6)
Floorlaying	164 (16.0)
Drywall	375 (36.6)
Others (cabinetry, highways/bridges, scaffold erections)	258 (25.2)

[a]Types of work are not mutually exclusive.

RESULTS

A total of 1,020 surveys were received from apprentice carpenters over 3–6-month periods in the respective training schools representing a participation rate of 85% among those approached. Participants were between 18 and 59 years of age with a mean of 27.5 years (median 26 years). They reported working for their current employer for a mean of 17 months (median 11 months) and having worked a mean of 8.7 months in the last year (median 10 months). The distribution of participants by school, time in the carpentry trade and recent types of work are presented in Table I.

Thirty percent (n = 314) of respondents reported having had at least one work-related injury *at some time* while working as a carpenter. Two-hundred seven (n = 207; 66%) individuals reported having sought medical care for a work injury and 118 (38%) missed work because of an injury. Nearly 80% (n = 239; 77%) reported at least one injury to their employer or supervisor; 23% (n = 73) filed a worker's compensation claim for their injury. At the time of injury 244 (79%) reported that they were covered by health insurance with the vast majority of those (n = 219; 90%) having coverage through their union-provided private coverage.

Fifteen percent (n = 150) reported knowing of coworkers use of private health insurance to cover care for work-related injuries. The more common reasons reported for doing so included perceptions that workers who file workers' compensation claims are not viewed favorably or are at risk of being laid off (64%) and use of private health insurance was less trouble (41%; Table II).

Most of these apprentices felt that they could report injuries to their current supervisor without worrying about how it would affect their job (64%; n = 642). Twenty-two percent (n = 222) felt they could not and 14% (n = 141) were unsure. When asked how often injuries were reported on their current job site 47% reported ''Always'' or ''Most of the time'' while 31% reported ''Rarely'' or ''Never'' (Fig. 1).

The vast majority of these apprentices (n = 819; 80.3%) had at some time worked for an employer with at least one of the eight safety program elements about which we asked. Post-injury drug testing was the most common practice reported by over 70%. Cash or prizes were as prevalent as policies that disciplined workers if they failed to report injuries.

In their current workplace 562 (55.1%) reported disincentives were in place with post-injury drug testing, discipline for injury, or coaching focused on personal behaviors (54.9%) being more common than rewards (16.4%; Table III). Rewards to supervisors for low injury reports were relatively uncommon in the current workplaces (n = 59; 6%).

Injury reporting was higher (20%) on sites that had reward programs for individuals or groups but not for

TABLE II. Use of Private Health Insurance for Work-Related Injury and Associated Reasons, Union Apprentice Carpenters, 2011

	Frequency (%)
Do you know of coworkers using private health insurance for work-related injury?	
Yes	150 (14.9)
No	434 (43.0)
Don't know	425 (42.1)
Reasons[a] for use of private insurance for work-related injury instead of workers' compensation (of 150)	
Workers who file WC are not viewed favorably (or concern about being laid off)	96 (64.0)
Less trouble to use private insurance	61 (40.7)
If report WC face discipline, lose prizes	55 (36.7)
Required post-injury drug testing	47 (31.3)
Help employer keep premiums low	47 (31.3)
Delays in getting treatment through WC	32 (21.3)
WC claims denied	30 (20.0)
Lower levels of benefits than negotiated sick leave	10 (6.7)
Miscellaneous other	20 (13.0)

[a]Reasons are not mutually exclusive.

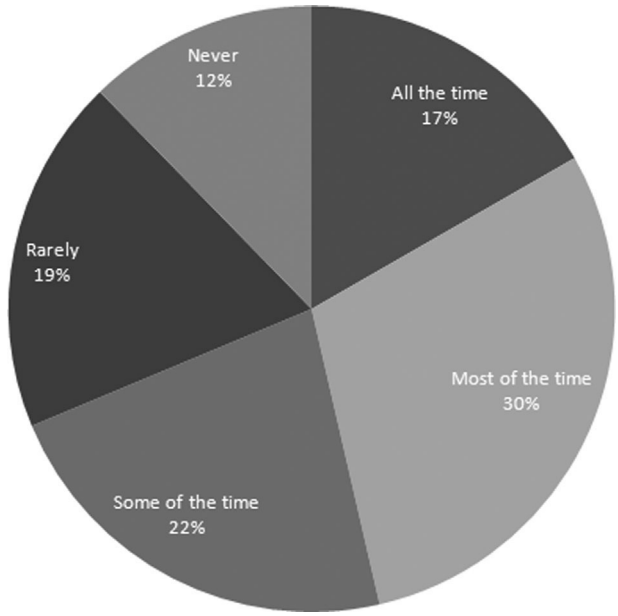

FIGURE 1. Estimate of how often injuries are reported on current worksite, carpenter apprentices, 2011.

supervisors, as well as on sites with post-injury coaching. These two elements were correlated (chi-squared P-value < 0.001). Injury reporting was 50% lower on sites where injured workers were disciplined (Table IV).

Individuals who currently worked in an environment where there was an absenteeism policy were 15% less likely to feel they could report an injury without repercussions; those who felt workers were disciplined for injuries were 45% less likely to feel they could report (Table V). No other associations with specific BBS elements were observed for reporting practices or comfort reporting injuries without fear of reprisal. There was some variability in injury reporting practices and comfort reporting injuries by which apprenticeship school the carpenters were from, but the effects of the different aspects of these programs were the same across all the apprenticeship schools. Multivariate log-binomial models were constructed adjusting for apprenticeship program the carpenter was affiliated with, time in the trade and time with current employer. No changes were observed from the crude prevalence ratios and the adjusted models are not presented. We did not attempt to adjust for various combinations of program elements on current worksites due to small cell sizes.

Comments of Carpenters

When asked if there were things we should be aware of that influence safety on construction jobsites or the reporting of work-related injuries, 157 carpenters (15.4%) offered comments. A few singular comments were made regarding specific recommendations for improving safety on jobsites including better housekeeping, tool maintenance, use of personal protective equipment, encouragement for hydration especially in heat, and the need for more safety training including "real toolbox talks."

There were only a few comments specifically about safety programs that included incentives or rewards and opinions regarding them were clearly varied as evidenced by the contrasting opinions expressed below.

> The only thing I see that works is if companies give out prizes for not getting hurt. Then people tend to try harder to be safer.

> The incentive programs for crews and foremen with low injuries often lead to accidents or injuries being hidden. "Don't report it and we'll get a bonus at 100 days." This allows the employer to later refuse benefits to employees.

Several strong themes emerged in the responses. Speed of work was the issue mentioned most often as having an influence on worksite safety. Production pressures were reported to take precedence over safety and contribute to injuries.

> The biggest factor involving safety is speed of the job. People work too fast for their own good. . .

TABLE III. Experience With Behavioral-Based Safety Programs, Union Apprentice Carpenters, 2011

Type of program[a]	Ever (n = 819)	Currently (n = 562)
Offered cash/prizes to individuals for no injury	323 (31.9)	140 (13.8)
Offered cash/prizes to group for low injury reporting	215 (21.3)	85 (8.4)
Rewards to supervisors for low injury reports	167 (16.6)	59 (5.9)
Policy of discipline for injury or threats of discipline	150 (14.9)	71 (7.0)
Policy that disciplined if failed to report injury	317 (31.4)	165 (16.4)
Post injury drug testing	710 (70.3)	476 (47.1)
Absenteeism	254 (25.1)	159 (15.7)
Safety coaching	350 (34.6)	221 (21.8)

[a]Programs are not mutually exclusive.

Safety goes out the window when a rush is put on us.

The biggest reason injuries occur in my observation is because workers sacrifice common safety precautions for the sake of time... usually to please the foreman or superintendent.

I think it should be a big deal to let every contractor and foremen know that they should slow down on the jobsite and I mean work wise. They don't care about safety because they are too worried on getting things done too fast.

Preaching safety and actually practicing safety [should] come hand in hand. Employers cannot only preach it but they have to have a hand in it.... especially when it comes to their attitudes dealing with [time] pressures.

TABLE IV. Prevalence of Injury Reporting on Current Jobsite and Prevalence Ratios (95% CI) by BBS Programs on Jobsite, 2011

	Injuries reported all the time or most of the time (n = 461), n (%)	Injuries reported sometimes to never (n = 530), n (%)	Prevalence ratios[a] (95% CI)
Type program[b]			
Reward individual	77 (16.7)	61 (11.4)	1.23 (1.04–1.46)
Reward group	48 (10.4)	36 (6.8)	1.26 (1.03–1.53)
Reward supervisor	27 (5.9)	31 (5.8)	1.00 (0.75–1.33)
Discipline injured	17 (3.7)	53 (10.0)	0.51 (0.34–0.78)
Absenteeism policy	77 (16.7)	81 (15.2)	1.06 (0.89–1.26)
Coach	118 (25.6)	103 (19.4)	1.22 (1.04–1.43)
Not reporting policy	79 (17.1)	86 (16.2)	1.04 (0.87–1.24)
Drug testing	233 (50.5)	237 (44.5)	1.14 (0.99–1.30)
Apprenticeship			
Chicago	118 (25.6)	184 (34.7)	0.77 (0.65–0.91)
S Illinois	100 (21.7)	103 (19.4)	0.98 (0.83–1.16)
St Louis	243 (52.7)	243 (45.9)	1
Time in trade			
5+ years	177 (38.5)	202 (38.0)	1.23 (0.84–1.78)
4–5 years	63 (13.7)	72 (13.6)	1.00 (0.68–1.78)
3–4 years	72 (15.6)	81 (15.3)	1.16 (0.81–1.67)
2–3 years	46 (10.0)	67 (12.6)	1.15 (0.79–1.66)
1–2 years	53 (11.5)	53 (10.0)	1.15 (0.82–1.61)
6 months to <1 year	27 (5.9)	24 (4.5)	1.30 (0.89–1.96)
<6 months	22 (4.8)	32 (6.0)	1
Time with current employer			
6 months or less	181 (40.3)	191 (37.3)	1.16 (0.97–1.39)
>6 months to 2 years	162 (36.1)	171 (33.4)	1.17 (0.97–1.40)
>2 years	106 (23.6)	150 (29.3)	1

[a]Prevalence compared to those without this type of program in current job.
[b]Prevalence ratios and 95% CIs constructed with log-binomial regression.

TABLE V. Prevalence That Carpenter Apprentices Felt They Could Report Injuries Without Having to Worry About Job Security and Prevalence Ratios (95% CI) by BBS Programs on Jobsite, 2011

	Feel can report (n = 642), n (%)	Feel cannot report (n = 362), n (%)	Prevalence ratios[a] (95% CI)
Type program[b]			
Reward individual	87 (13.6)	52 (14.4)	0.99 (0.87–1.14)
Reward group	51 (7.9)	33 (9.1)	0.94 (0.79–1.13)
Reward supervisor	34 (5.3)	24 (6.6)	0.91 (0.73–1.14)
Discipline injured	21 (3.3)	48 (13.3)	0.46 (0.32–0.66)
Absenteeism policy	88 (13.7)	70 (19.3)	0.85 (0.73–0.98)
Coach	135 (21.0)	86 (23.8)	0.94 (0.84–1.09)
Not reporting policy	102 (15.9)	61 (16.9)	0.97 (0.86–1.11)
Drug testing	299 (46.6)	172 (47.5)	0.99 (0.90–1.08)
Apprenticeship			
Chicago	168 (26.2)	137 (37.9)	0.80 (0.71–0.90)
S Illinois	134 (20.9)	71 (19.6)	0.95 (0.85–1.07)
St Louis	339 (52.9)	154 (42.5)	1
Time in trade			
5+ years	245 (38.2)	139 (38.5)	0.99 (0.80–1.22)
4–5 years	79 (12.3)	57 (15.8)	0.90 (0.71–1.15)
3–4 years	94 (14.7)	58 (16.1)	0.95 (0.76–1.20)
2–3 years	75 (11.7)	38 (10.5)	1.02 (0.81–1.30)
1–2 years	79 (12.3)	29 (8.0)	1.12 (0.89–1.41)
6 months to <1 year	32 (5.0)	20 (5.5)	0.94 (0.71–1.26)
<6 months	36 (5.6)	20 (5.5)	1
Time with current employer			
6 months or less	257 (41.1)	125 (35.9)	1.03 (0.92–1.16)
>6 months to 2 years	200 (32.0)	135 (38.8)	0.91 (0.81–1.04)
>2 years	168 (26.9)	88 (25.3)	1

[a]Prevalence compared to those without this type of program in current job.
[b]Prevalence ratios and 95% CIs constructed with log-binomial regression.

Some of the comments directly connected effects of the low bidding of jobs to work pace and injury risk.

> It's always go-go-go. No one cares about us as long as we make hours. If you try to be safe it takes too much time, they think. Companies and contractors need to allow more hours in the bids for time to be safe.

> What this does to the work and workers is unfair.

Others described pressures imposed by the tight economy to do work that might not be safe and to avoid altering work arrangements even in the face of medical recommendations.

> If something that needs to be done is dangerous, the employer should take extra precautions instead of just saying "Go do it or go home."

> Times are rough. You can't afford for a doctor to say light duty or time off [because of injury or illness].

There were numerous concerns about how reporting injuries might influence employability. Some of these were linked to speed issues, but not all.

> They want it faster and if you are injured, go home and don't report it. There are a lot of other guys in line to replace you.

> If you get hurt and report it you will be replaced.

> You are pretty much screwed if you get hurt at work. You will probably get worker's comp but you will most likely never go back to work for the company for an extended period of time.

With my company, people are afraid to report injuries even when they get hurt because they will lose their jobs. Not immediately, but in like 2 or 3 months when it blows over, you're fired.

It was common knowledge at [XX construction] that most foremen and safety would push you to go to the hospital under your own insurance.

Injuries label employees as accident prone and employers will do what they can to reduce your hours and/or terminate an employee using whatever reason they can.

From experience with many companies, if you get hurt you're looking for a new job.

We do not report injuries because we're threatened with discipline most of the time.

In today's economy more people are likely not to report injuries due to fear of termination. They also might report injuries that are nonexistent for monetary gain.

There should be laws or regulations to stop employers from getting rid of employees after a workers' compensation claim for a predetermined period of time such as three years or something.

The term ''Fired before you hit the ground'' is used too much in our industry.

The pressures these workers felt were not always overt.

Most employers make it difficult to report injuries with subtle hints not outright threats.

I worked for a company that had to maintain a 0% accident policy to be able to keep their contract with a major company. I got the impression, which was strongly implied, if I got hurt I was no longer employed.

They say report all injuries but we all know you have it happen more than once and you're gone. That's the same at every company I've worked for in the union.

Working my last job I felt that reporting injury would result in lay off. Most people having (a) lost time injury were laid off when they returned to work. Made workers scared to report injuries.

If employees report injuries it is frowned upon—if any type of back injury occurs you are considered a liability and no longer useful.

Employees need to feel they are not at risk of losing their job when reporting injuries.

A number of apprentices called for more of a role of union stewards and responsibility of safety committees and foremen.

Train union stewards to enforce better safety practices.

Safety people need to be more on their jobs inspecting sites for hazards and making sure everyone knows of dangers.

Put a safety committee in place for each company.

Safety must be a priority for those who directly supervise carpenters. When foremen don't take safety seriously, neither does the crew and that puts everyone at risk.

These apprentices also had comments about their union colleagues, especially in the role of foremen.

Professional journeymen can set bad examples of safety for inexperienced tradesmen, and a general pace of work that is often too hasty.

Too many 1st term guys with no experience are thrown into doing something they don't know how to do.

I think safety issues occur because some carpenters are not properly trained to use certain tools and are embarrassed to let their supervisor know ahead of time.

Sometimes my foreman rushes us to get things done. He constantly talks and yells and makes comments. At times this can become very distracting. It puts unnecessary stress and strain on workers. This is not a safe practice in my opinion.

Not all comments were negative. One worker had great praise for his company's approach to safety. Another

clearly described a ''practice-based'' safety program focused on hazard reduction as well as incentives for reporting, but these comments were exceptions.

> The company I work for goes above and beyond. Anytime we need new safety equipment, it is instantly assigned to us.

> The GC [general contractor] on my job has an incentive program for reporting and correcting any unsafe practices or hazards found on the job site with monthly prizes.

It is of note that the individuals who provided these text comments were representative of the overall group in terms of geographic location of their school, mean age, mean time with current employer, injury experiences, jobsite reporting practices and comfort reporting work-related injuries without fear of retribution.

DISCUSSION

Data collected through these anonymous surveys of union apprentice carpenters document a career high prevalence of exposure to safety incentives and repercussions of injury reporting on construction sites. It is not surprising to us that workers whose job sites had policies involving discipline as a consequence of injury were more likely to indicate they could not report injuries without fear of reprisal than those who did not work under such programs. Aside from this association, we saw minimal evidence of associations between injury reporting practices or comfort reporting injuries and the specific program elements about which we asked.

We did identify considerable evidence of underreporting of work-related injuries from these apprentices. Specifically, it is of note that over 30% described that work-related injuries were reported almost never or rarely and less than half described their being reported all or most of the time. The magnitude of this underreporting and its significance for injury epidemiology will depend on variability by the size of worksites and the prevalence of risk and injury, as well as whether it is systematic with respect to variables such as age, tenure, job exposures, and current economic conditions.

Knowledge of coworkers seeking medical care for a work injury through private insurance coverage was also reported by 15% of respondents and was most commonly tied to feelings that workers who file workers' compensation are not viewed favorably. In all likelihood this is an under-estimation of the occurrence of such. Further, even though most apprentices reported that they felt they could report injuries to their supervisor without fear of retribution, the open text comments of these apprentices provide clear evidence of pressures to perform under conditions that are not always felt to be safe and, at least for some, the fear of reporting injuries in this downturn economy. We believe the lack of consistency in these findings reflects the complexity of the issues we were exploring.

It is important to recognize that through this work we were exploring associations, not causality. Furthermore, a more comprehensive assessment of jobsite risks, and management practices was beyond the scope of this work. The lack of observed association between these safety programs and reporting should not be construed as evidence that the programs did not have effects on injury reporting practices. In fact, we believe that it is likely that the context in which these programs operate is of great importance. For example, we asked about exposure to work policies warning workers they would be disciplined for not reporting all injuries. The effects of such programs could be quite vast as some people in the organization might want reports, such as a safety officer, but a foreman might still want to fire you for having been injured, particularly if relations between the foreman and worker were already strained [Eakin and MacEachen, 1998]. The same is likely true when it comes to ''commitment'' from higher-ups. Such calls could have different effects depending on how foreman directly supervising the work are affected by injuries that occur under their watch [Nichols, 1997]. This interpretation is consistent with the recent Government Accountability Office investigation of the effects of incentives for safety and punishments for injury in a probability sample of U.S. manufacturers that was conducted in response to a specific congressional request. The prevalence of exposure to such programs was high with considerable variability in effect reported depending on the context in which the program operated [US Government GAO, 2012].

Through surveillance efforts on a large university-owned and managed building project in Colorado, a safety program was observed that appeared to have positive effects based on feedback from diverse groups of workers collected through focus groups as well as injury reporting experiences. Workers were encouraged to take advantage of many training opportunities on site (including OSHA 10 hr and site specific training activities) but this program largely rewarded good safety records. Workers and supervisors both received rewards for few injuries, but key features included accountability, and disincentives for non-reporting of injuries as well as attention to the hierarchy of controls so that hazards were avoided when possible [McDonald et al., 2009]. It appeared, in this case, that the reward was for a safer worksite rather than for non-reporting of injuries evidenced by quite high rates of minor events but rare cases of serious injury.

In contrast, data from active injury surveillance with union carpenters documented that at times workers faced

subtle pressures not to report injuries based on work norms as well as ''safety'' incentives [Lipscomb et al., 2010]. Some injured apprentices feared reporting because of job security issues while others said injuries were ''part of being a carpenter.'' Others described getting the message that they ''should not report'' their injuries as well as more overt pressures not to report including being asked directly to file for work-related medical care on their union provided or private insurance policy. All of these findings are consistent with the comments made by these apprentice carpenters we surveyed.

Collecting data from union apprentices had several advantages. Access through their classrooms allowed us to approach a large number of carpenters in a relatively short period of time. Furthermore, the schools were willing to allow the apprentices 15 min to complete the short survey as they rotated through their regular training activities. The willingness of the training programs to allow time to complete the surveys in the classroom likely contributed to the high (85%) participation rate among those approached. We were able to reach carpenters working across a variety of construction sectors including both residential and commercial work. Even though we recruited only apprentices, these less experienced carpenters are hired by the same contractors hiring union journeymen. The reports of jobsite programs represent exposure beyond apprentices, although perceptions of apprentices and journeymen may vary, particularly as related to job security. The apprentices we surveyed were not all new to the trade since it is not unusual for carpenters who join the union to have had construction experience prior to union membership. Given the difficulty in efficiently gaining access to large numbers of construction workers, these are not insignificant issues.

Because union carpenters have health insurance benefits acquired through their union employment they may be particularly vulnerable to pressures to cost-shift by seeking care through the private health care system for work-related injuries, particularly if they do not feel they are likely to result in extended inability to work. We have also described patterns of care through workers' compensation and union-based private insurance coverage that are consistent with possible cost-shifting related to care of low back injuries [Lipscomb et al., 2009a,b]. Our findings are consistent with reports of other investigators who have described reasons for not reporting work-related injuries that include economic pressures and threat of stigmatization or job loss [Biddle et al., 1998; Rosenman et al., 2000; Dembe, 2001; Azaroff et al., 2002; Shannon and Lowe, 2002; Fan et al., 2006].

The text comments volunteered from 15% of respondents clearly document the importance of understanding the broad context in which these carpenters work. The comments were easy to categorize and report, they are powerful, and they essentially speak for themselves. The fact that they come from a unionized workforce is disconcerting. Unionized workers are sometimes thought to be more likely to report injuries and to have advocacy links that non-union workers lack—which they very well may [Weil, 1992]. However, their comments tell of pressures to work beyond limits of safety and significant insecurity about maintaining work in the face of work injuries, particularly in a downturn economy. While we cannot guarantee that the free text comments are generalizable, it is noteworthy that they came from a group of respondents who were statistically representative of the group as a whole in respect to all measured attributes including age, tenure, geographic area, and injury experience.

The use of incentives and punishments are part of the current repertoire of behavioral safety processes or behavioral-based safety (BBS) programs which center on reduction of injury ''triggered by unsafe or at-risk behaviors'' of individuals [Cooper, 2009]. Such programs are rooted in two misguided theories. The focus on individual worker behavior stems from work of H.W. Heinrich from the early 1930s in which he reported that 88% of workplace accidents were caused by unsafe acts of workers [Heinrich et al., 1941]. Heinrich's work was based on the review of accident reports from the 1920s generated by supervisors who were quick to blame workers. Further, the records do not remain available for review that would allow any assessment of quality or process [Manuele, 2003]. The psychological basis for focus on individual worker behavior change in these programs was operant conditioning [Skinner, 1938] which failed to create lasting behavior change once the ''carrots and sticks'' were removed.

Through this survey we did not explore participation-focused programs which provide an alternative to results-focused programs. Participation-focused programs reward workers for taking part in the process of safety improvement. In such programs, rewards are offered for identifying hazardous conditions and proposing solutions so that hazards may be eliminated and injuries avoided. Attending safety committee meetings and providing feedback are other components that may be rewarded under such a program. One participant volunteered information about such a program on his current jobsite, but we do not have any estimate of overall prevalence of such. These strategies should not have the same type of effects on injury reporting as those focused solely on results driven through rewards and deterrents. However, it is important to recognize that, placing the focus of work-related injury prevention on human agency dangerously ignores the more efficient upper tiers of the public health hierarchy of controls [Levy et al., 2011] which steer attention to substitution and redesign of dangerous processes, materials and equipment in a manner that will have sustained effects on all workers. Dekker et al. [2012] eloquently describe how

''safety researchers are informed by—and also a formative part of—the Western moral enterprise which elevates responsibility, choice and autonomy above almost any considerations. . .,'' and in so doing how we can fail to consider systemic issues that broadly influence the safety of workers.

CONCLUSIONS

It is clear that safety programs involving rewards and punishments are in place frequently enough in construction to warrant their careful evaluation. Further assessment of programs that clearly distinguish between efforts that are ''results-based'' and those that are ''practice-based'' could be useful. The former are centered on rewarding employees who go some period without injury, while the latter are intended to reward workers for taking part in such activities intended to improve safety in their workplaces.

However, some of the themes that emerged from volunteered comments of workers reflect Theo Nichols [1997] argument for a political economic perspective on injury rates and risk in which he suggests that ''intensification of labour'' is a primary risk factor for injury. These comments should not be ignored. Further, the comments add credence to the very recent description of our current workers' compensation system as ''irrational, at best, and unjust at worst'' [Spieler and Burton, 2012].

The perspectives of these apprentices on unsafe production pressures add to our understanding of more nuanced effects of other safety efforts. For example, Welch et al. [2007] have described more recent efforts of major construction owners to pre-qualify bidders based in part on safety records. While such efforts, designed to help control overall costs of construction, may have positively resulted in safer workplaces, we see examples here for how the tight bidding processes and requirements for maintenance of a large contract can lead to pressures on workers not to report injuries. The speed at which workers' are expected to perform is an important element of the overall work organization in construction, and pressures to perform outside the level of safety may increase as project deadlines near. However, this hazardous condition needs to be addressed, not by rewarding workers for being more careful when they are pushed, by rather by stopping this level of production pressure. We believe that the multiple layers of disincentives for reporting injuries and the consequences of not reporting make results-based programs questionable safety solutions. Given the comments of many survey participants, this may be particularly true for less experienced workers in the current, slowed-down construction economy.

More subtle pressures not to report injuries will be even more difficult to study and understand than more clearly defined elements of safety programs. It seems unlikely that they will be understood through relatively simple survey techniques we used here. These pressures do not arise in a vacuum, they take time to be adopted and they may wax and wane in accordance with a host of contextual factors. Additional efforts designed to help us understand variation across job sites, as well as time, are needed including exploration of the effects of different actions/behaviors/comments of foremen, safety personnel, peers, and employers.

Obviously, the goal of workplace safety programs should be the actual prevention of injuries through the creation of safer places for people to work. Prevention efforts or working conditions that foster non-reporting of injuries may lead to negative consequences for the individual such as improper treatment of the injury, which may lead to unnecessary sequelae and increase risk of future injury and extend lost work time. In addition, the concealing of injuries also means that safety hazards go unrecognized and therefore uncorrected leaving injury risk unchanged. Both of these problems ultimately pose threats to safety and to productivity.

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