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Employee assistance programs, drug testing, and workplace injury

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ABSTRACT

Introduction: Little is known about the effects of employee assistance programs (EAPs) on occupational injuries. *Materials and methods:* Multivariate regressions probed a unique data set that linked establishment information about workplace anti-drug programs in 1988 with occupational injury rates for 1405 establishments. *Results:* EAPs were associated with a significant reduction in both no-lost-work and lost-work injuries, especially in the manufacturing and transportation, communication and public utilities industries (TCPU). Lost-work injuries were more responsive to specific EAP characteristics, with lower rates associated with EAPs staffed by company employees (most likely onsite). Telephone hotline services were associated with reduced rates of lost-work injuries in manufacturing and TCPU. Drug testing was associated with reductions in the rate of minor injuries with no lost work, but had no significant relationship with lost-work injuries. *Practical applications:* This associational study suggests that EAPs, especially ones that are company-staffed and ones that include telephone hotlines, may prevent workplace injuries.

Illicit drug use in the workplace is believed to result in higher rates of occupational injury because of impaired performance (Spicer, 2002). However, drugs and alcohol are less involved in occupational injuries than in other unintentional injuries (Smith, Spicer, & Streiker, 1999). Data on drug involvement in occupational injuries is limited and according to the National Academy of Sciences (Normand, Lempert, & O'Brien, 1994), a causal linkage is hard to find (Hingson, Lederman, & Walsh, 1985; Hoffman & Larison, 1998; Holcom, Lehman, & Simpson, 1993). Notwithstanding the lack of a clear causal connection between drug use and work accidents, several high-profile transportation accidents involving alcohol or drugs (e.g., the Exxon Valdez) have increased the pressure for anti-drug efforts in the workplace to prevent and deter drug use and thus improve job performance and safety. However, very few studies have examined their efficacy. In this paper, we focus on the relationship between workplace safety and anti-drug programs. Specifically, we examine whether firms with employee assistance programs, drug testing, and formal/written policies on drug use in the workplace have lower occupational injury rates than firms without such programs.

Employee assistance programs (EAPs) originally began as occupational alcohol programs largely in industrial companies. EAP "Core Technologies" were originally defined in the 1980s to include a focus on employee alcohol and other substance abuse problems, linkage with in-house and outside resources for employee assistance, and manager or supervisor training on how to engage EAP resources (Attridge, 2010). EAPs usually provide screening, assessments, brief interventions, short-term counseling, referrals to other services, and case management with follow-up for mental health and substance abuse problems while also protecting employee confidentiality. While EAPs have evolved over the years to include services for work-life concerns, addressing alcohol and substance abuse problems in the workforce remains a core priority (Bennett & Attridge, 2008; Steele, 1998).

In addition to EAPs, employers have instituted drug testing and written or formal policies on drug use. The 1988 Drug-Free Workplace Act requires recipients of federal grants and contracts to certify that they maintain a drug-free workplace and subsequent executive orders similarly direct federal agencies. Safety-sensitive transportation workers have been subject to random drug testing since January 1990 for most modes and since January 1992 for trucks and buses. Private sector employment is often conditioned on passing a drug test and employers also use for-cause testing triggered upon suspicion or as part of an incident investigation.

Correlational studies (Carpenter, 2007; French, Roebuck, & Alexandre, 2004; Miller et al., 2015) consistently find workplace substance abuse prevention programs are associated with reduced illicit drug use. It is less clear how these programs affect workplace injury. Although numerous studies have evaluated the savings from EAP services (Attridge, 2010; Csiernik, 2004; Roman & Blum, 1996), they generally have focused on a single EAP. A large study of federal government EAP users across several occupations reported decreases in absenteeism, and improved

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self-reports of workplace productivity and perceived health status (Selvik, Stephenson, Plaza, & Sugden, 2004). We found only three studies that assessed EAP impact on injury. Analyzing linked employee benefits data and Bureau of Labor Statistics injury data, Waehrer and Miller (2009) concluded that EAPs reduced lost-workday injuries in firms with 250 or more employees. Two case studies at single companies, however, found no effect on workers' compensation claims (Collins, 1998; Schear, 1995).

As a recent review points out (Levy Merrick, Volpe-Vartanian, Horgan, & McCann, 2007), larger-scale EAP studies are needed that span multiple worksites and employers and better control for group differences and program characteristics such as sponsorship, staffing, and service provision. For example, relative to company staffed EAPs, having EAPs staffed by outside contractors (most likely to be offsite) may reduce interactions between EAP providers and firm supervisors, making early intervention in problem situations difficult. Telephone hotline services may help to reduce the stigma associated with seeking EAP help (Cook, Back, & Trudeau, 1996), or increase access to EAP services for clients with scheduling problems or mobility issues while also providing case management and follow-up services in between face-to-face counseling sessions (Selvik et al., 2004; Sharar, Popovits, & Donahue, 2010). Recognizing that some EAPS may provide a comprehensive range of services in the workplace while others may not, the Institute of Medicine stated that studies of EAP effectiveness that fail to consider this variation are inadequate (Normand et al., 1994). Yet, no research has fully examined how workplace effects vary across EAP characteristics and services.

Most studies of the effects of workplace anti-drug programs on injury focus on drug testing. Ozminkowski et al. (2003) saw a deterrent effect of drug testing in data from 15 sites of a single U.S. manufacturing company that were randomly assigned different testing rates. Doubling the testing rate halved the odds of injury. Spicer and Miller (2005) and Miller, Zaloshnja, and Spicer (2007) found that random drug testing in conjunction with peer-to-peer substance abuse prevention and early intervention reduced injuries in railroading as did random alcohol testing. Wickizer, Kopjar, Franklin, and Joesch (2004) found significant reductions in workers' compensation injury claim rates in firms that implemented drug free workplace programs (including drug testing) in construction, manufacturing, and services but not in other injury groups. Fox (2013) found that pre-employment testing allowed firms to avoid hiring substance abusers with high injury risks (possibly due to their risk-taking personalities rather than their substance abuse) and thus reduce their injury rates relative to firms without testing. In construction, Gerber and Yacoubian (2001) found firms that implemented drug testing halved their workers' compensation injury claim rates within two years while Schofield, Alexander, Gerberich, and Ryan (2013) found drug testing was associated with reduced workers' compensation injury claim rates. Reductions in both construction studies were at best marginally statistically significant. In a survey of organizations with 500–2500 employees (Fortner, Martin, Evren-Esen, & Shelton, 2011), 14% reported workers' compensation claim incidence rates above 6% prior to a drug testing program, but only 6% had rates this high after implementation. It seems unlikely that these survey reports separated effects of testing from a broader national decline in claims.

This study reaches back in time to link and analyze data on firms' injury rates and their use of EAPs, drug testing, and formal workplace policies using two large surveys conducted in the 1980s. While the data are not recent, they refer to a period when EAP services were more heavily focused on preventing substance abuse related problems. The linked data enable us to assess whether workers were safer in firms with such substance abuse prevention efforts and to assess the relative strength of association between safety and different anti-drug strategies—drug-free workplace policy, drug testing, and EAPs (hereafter referred to collectively as "anti-drug programs")—as well as whether those strategies relate differently to minor injuries versus those that are serious enough to involve some work loss. We also examine the relationship between the reported injury rate and specific EAP characteristics including sponsorship, staffing, provision of a telephone hotline, and other drug-related services.

Methods

Data

For drug policy information, with Institutional Review Board approval, we used the 1988 Bureau of Labor Statistics (BLS) Survey on Employer Anti-Drug Programs (SEADP), a unique quick response survey that gathered information on the extent and characteristics of employer-instituted anti-drug programs in a sample of 7502 non-agricultural establishments.

The SEADP identifies whether establishments employ drug testing defined as "tests to identify the presence of metabolites of drugs in urine or blood samples" (U.S. Department of Labor, 1989). The availability of EAP services was measured using the question "Does this establishment provide for a formal employee assistance, counseling, or treatment program to help employees with drug problems?" The survey indicates whether establishments had a formal written policy on drug use (which might have included information on testing practices and EAP services available). Information gathered on characteristics of EAPs included sponsorship, staffing, and specific services offered.

Injury data for each establishment were drawn from the 1989 Annual Survey of Occupational Injuries and Illnesses (SOII), which relies on logs that employers maintain according to Occupational Safety and Health Administration (OSHA) guidelines. The 1989 survey collected employer reports of worker injuries from a sample of about 250,000 private industry establishments. The establishments reported on numbers of injuries and illnesses of various types (without lost work, with only restricted-work days, or with days away from work) that occurred during the year. They also reported total annual hours worked by all employees, annual average number of employees, and the establishment's industry.

We linked establishment data from the SEADP to the SOII using information available for each establishment in the survey on state, county, 4-digit Standard Industrial Classification code, and unemployment insurance identification number. Linking the SOII to the SEADP resulted in a final sample of 1405 non-agricultural establishments with valid data on both anti-drug programs and workplace injuries. About half of the firms in the linked sample had over 1000 employees, a larger proportion of large firms than the original surveys (because large firms were oversampled in both surveys). Thus, our results are more pertinent to large establishments than to all firms.

Statistical models

The analysis focused on the relationship between workplace anti-drug efforts and non-fatal workplace injuries of two types—severe injuries involving some lost work and less severe injuries that require medical treatment but do not involve any lost work.[a] This approach tested if workplace programs had a different relationship with injuries of different severity.

For workplace anti-drug programs, we created three indicator variables equal to one if establishments reported using drug testing, a formal drug policy, or an EAP. We also created an indicator for "any program" equal to one if an establishment reported any one of these three efforts to address drug use. For establishments with an EAP, we measured sponsorship with three indicators for whether the EAP was

[a] We do not include illnesses in our analysis since they are more likely the result of cumulative exposure to the workplace instead of a traumatic event.

sponsored by management, resulted from union-management collaboration, or had union or another type of sponsorship. EAP staffing was flagged by an indicator for whether the program was staffed by an outside contractor (i.e., most likely off-site) versus company employees (most likely on-site). We created an indicator for provision of a telephone hotline for employees to get in touch with a counselor for assistance in dealing with crises brought on by drug or alcohol use. Finally, we flagged establishments with EAPs that did not offer any drug-related services such as drug education and awareness programs, counseling, referrals for drug treatment, and follow-up services for identified drug users.

Models also controlled for other firm characteristics that may affect workplace injury rates including the gender and occupational composition of the workforce. Specifically, we added data on the percentage of women workers at the most detailed industry level possible using data from the 1988 Current Employment Statistics. Data on the percentage of workers in seven large occupational categories were also merged at the detailed industry level using data from 1989–91 Occupational Employment Statistics.[b] We used average injury rate for the firm's 3-digit industry as a proxy for the inherent riskiness of work in the establishment. Establishment size was controlled for using five dummies (fewer than 49 employees, 50–99, 100–499, 500–999, 1000 workers or more). Under the experience rating system, larger firms face workers' compensation premiums that are more closely linked to their actual injury experience, increasing the incentive for large employers to reduce compensable injuries. Since workers' compensation has also been shown to increase the relative frequency and severity of hard-to-diagnose injuries (Butler, Durbin, & Helvacian, 1996; Robertson & Keeve, 1983; Ruser, 1998), we added data on maximum weekly workers' compensation benefit and waiting period in the state to control for any worker incentives affecting occupational injury reporting.

Of 1405 establishments in our linked sample, 8% reported zero lost-workday injuries (LWD) and 12% reported zero injuries with no lost work (NLW). Because of the discrete nature of the data and the number of establishments with zero injury counts, our analysis used a count-data model with a negative binomial distribution generating the injury counts.[c] Since establishments with more employees may be expected to have higher injury counts, our models analyze rates of injury by controlling for the logged number of full-time equivalent employees (FTEs) in each establishment.[d] Coefficients on anti-drug programs in the negative binomial regressions represent the natural log of the injury rate ratio for establishments with and without the programs, holding all other variables constant. The exponentiated coefficients thus represent the injury risk ratio for establishments with and without the programs.

We present results for the full sample, by different establishment size categories and for two industry groupings where anti-drug programs are most prevalent: (1) manufacturing and (2) transportation, communications, and public utilities (TCPU). We estimated all models using STATA software with standard errors that are robust to heteroskedasticity in the error term.[e]

[b] Three years of OES data are needed to span the entire industry spectrum. Earlier data were unavailable but our estimate of the occupational distribution should not be measurably different from that in 1988.

[c] Given the large number of establishments with zero counts of injuries, the data are overdispersed violating the Poisson assumption of equality of mean with variance. Negative binomial distributions allow for overdispersed data by modifying the Poisson model with an error term. The exponentiated error follows a gamma distribution and has an expected value of 1.

[d] We calculated the number of full-time equivalent employees in each establishment as the total annual hours worked by all employees divided by 2080 assuming a 40-h workweek for 52 weeks of full-time employment.

[e] We checked the robustness of our results by also estimating simple linear regression models of the injury rate. Results were qualitatively similar to those reported here. Note that count-data models are preferable to OLS regressions that can result in negative predictions of the injury rate.

Results

Table 1 summarizes use of anti-drug programs and nonfatal injury rates for the linked sample of establishments in both the SEADP and the SOII.[f] Injury rates were calculated as the total number of nonfatal injuries divided by the number of FTEs. The average injury rate was 11.9 nonfatal injuries per 100 FTEs in the linked sample with construction reporting the highest rate of 17.2 injuries per 100 FTEs. The overall injury rate displayed an inverted U-shaped relationship with firm size, similar to the pattern observed in contemporaneous national nonfatal occupational injury data (Leigh, 1989).

Two-thirds of firms in the linked sample (65%) used a formal written policy regarding drug use, 62% had EAPs, and 41% used drug testing.[g] Drug testing generally coexisted with a drug policy—only 14% of the establishments without a formal drug policy used drug testing in the workplace.

Reflecting the requirements for safety-sensitive jobs, drug testing was most common in TCPU, with 62% of establishments testing. More generally, TCPU companies used anti-drug programs most frequently (87%), followed by manufacturing firms (84%). Despite having the highest injury rate (17.2 injuries per 100 FTEs), the construction industry used anti-drug programs less frequently than other industries—only 51% of construction establishments had a formal policy on drug use, 28% had EAPs and 21% used drug testing.

Anti-drug programs were more prevalent in large establishments with over 500 employees in 1988. Almost half these firms used drug testing. By contrast, only 8% of workplaces with fewer than 50 workers used drug testing. Similarly, EAP availability declined with firm size. Formal drug policies, though also more prevalent in larger firms, were frequently used in small establishments as well.

Table 1 also reports characteristics of EAPs by industry and firm size. In 1988, 62% of EAPs provided a telephone hotline, with highest use in the finance, insurance and real estate industry (FIRE, 71%). Not surprisingly, the vast majority of EAPs offered drug education, counseling, referral or follow-up services. Management sponsorship of EAPs was dominant, especially in the retail, FIRE, and services sectors. Union-management collaborations were more common in manufacturing and TCPU, two industries with a higher proportion of union workers. Two-thirds of EAPs were staffed by outside contractors.

Results from the negative binomial regressions in Tables 2 and 3 show the relationship between establishment anti-drug efforts and workplace injury rates for the full sample, for establishments stratified by employer size, and for establishments in the manufacturing and TCPU industries. As stated earlier, the tables report the incidence rate ratios for establishments with a particular program relative to those without after controlling for establishment size, 2-digit industry, workforce composition and average earnings of each establishment's 3-digit industry, and state workers' compensation characteristics. Model numbers in Tables 2 and 3 refer to different specifications: without distinguishing between the different types (model 1); only examining drug policy and drug testing (models 2 and 3); only examining EAPs (model 4); controlling for all three programs (model 5).

Among the full sample of 1405 establishments in Table 2, those reporting any program (either a formal drug policy, drug testing, or an EAP) were insignificantly different in the rate of minor injuries involving no lost workdays from those who did not undertake any anti-drug efforts in column 1. However, when anti-drug programs were analyzed separately, differences emerged. In particular, drug testing was associated with approximately a 15% reduction in the risk of NLW injuries in column 3, and establishments with EAPs had a similar 14% reduction in the risk of these injuries in column 4. These associations remained relatively unchanged when all the programs were analyzed together in column 5.

[f] Table 1 means are unweighted because SEADP weights were not available to us.

[g] In the original SEADP, a formal drug policy was used by 16% of firms, followed by EAPs (4%), and drug testing (3%) (U.S. Department of Labor, 1989).

Table 1
Distribution of anti-drug programs in linked data[a].

						EAP sponsorship[b,c]				Other EAP characteristics		
	Injury rate	% with any program	% with drug policy	% with drug testing	% with EAP	% mgmnt.	% Union	% Union-mgmnt.	% other	% with outside staff	% with phone hotline	% with drug services
All	11.90	81	65	41	62	68	0	24	3	61	62	93
By establishment size												
≤49 employees	10.08	49	37	08	20	79	0	07	14	64	64	10
50–99 employees	16.21	67	57	19	32	78	0	15	0	70	44	93
100–499 employees	13.87	68	53	31	45	74	0	15	4	64	46	93
500–999 employees	13.01	83	67	45	63	74	0	16	4	68	59	93
≥1000 employees	10.30	92	75	51	79	69	1	21	3	50	61	93
By Major Industry												
Mining	6.40	80	78	54	56	70	0	4	4	48	43	78
Construction	17.50	61	51	21	28	59	4	15	11	56	41	89
Manufacturing	14.08	84	69	53	70	68	0	24	3	55	58	94
Transp/comm/utilities	11.53	87	78	62	72	66	0	26	2	61	62	93
Wholesale trade	14.79	82	71	44	55	56	0	2	8	60	64	84
Retail trade	12.84	77	66	13	41	81	2	8	20	69	54	94
F.I.R.E[d]	2.78	81	57	21	71	80	0	1	1	76	71	10
Services	7.57	79	52	20	61	83	1	06	04	43	53	93

[a] Excludes private agricultural establishments.
[b] Distribution of EAP characteristics based on 876 establishments with an EAP.
[c] Sponsorship does not sum to one because of missing values.
[d] F.I.R.E. stands for Finance, Insurance, Real Estate.

Firms with drug testing had lower NLW injury rates (both with and without controlling for EAPs in columns 3 and 5) for firms with over 50 employees and for larger firms with over 100 employees. When only large firms with over 500 employees were considered, results were qualitatively similar but statistically insignificant.

EAPS were also associated with reduced NLW injury rates per 10,000 full-time employee equivalents with decreases of 17% and 14% for firms over 50 and over 100 employees respectively in column 4. However, again possibly because of the smaller sample involved, the relationship fell short of statistical significance for establishments with over 500 employees when other anti-drug efforts such as drug testing were also included (column 5).

When models were estimated separately for establishments in the manufacturing and TCPU industries, some differences emerged. EAPs were marginally associated with a reduced risk of NLW injury for manufacturing establishments and a larger but statistically insignificant reduction in NLW risk for the TCPU industry. Conversely, drug testing was significantly associated with a large 35–38% reduction in NLW injury rate (with and without controlling for EAPs) in the TCPU industry but had no discernible relationship with NLW injuries in the manufacturing

Table 2
Incidence rate ratios from negative binomial model of no-lost-work injuries[a].
(Std. errors in parentheses).

Sample	Program	Model 1[b]	Model 2	Model 3	Model 4	Model 5
All:N = 1405	Any program	0.972 (0.079)				
	Drug policy		0.978 (0.065)	1.044 (0.072)		1.066 (0.075)
	Drug testing			0.845** (0.060)		0.859** (0.062)
	EAP				0.856** (0.058)	0.867** (0.063)
Emp ≥ 50; N = 1334	Any program	0.937 (0.077)				
	Drug policy		0.973 (0.065)	1.034 (0.071)		1.061 (0.076)
	Drug testing			0.856** (0.061)		0.876* (0.063)
	EAP				0.831*** (0.057)	0.842** (0.061)
Emp ≥ 100; N = 1251	Any program	0.915 (0.079)				
	Drug policy		0.961 (0.066)	1.017 (0.073)		1.043 (0.077)
	Drug testing			0.868* (0.063)		0.879* (0.064)
	EAP				0.859** (0.061)	0.869* (0.066)
Emp ≥ 500; N = 897	Any program	0.748** (0.087)				
	Drug policy		0.870* (0.074)	0.901 (0.079)		0.928 (0.085)
	Drug testing			0.908 (0.077)		0.910 (0.077)
	EAP				0.847* (0.073)	0.870 (0.079)
Manuf = 1; N = 565	Any program	0.879 (0.098)				
	Drug policy		0.924 (0.079)	0.926 (0.094)		0.957 (0.099)
	Drug testing			0.994 (0.098)		1.009 (0.099)
	EAP				0.836* (0.079)	0.845* (0.086)
TCPU = 1; N = 212	Any program	1.419 (0.437)				
	Drug policy		1.322 (0.269)	1.791*** (0.374)		1.824*** (0.376)
	Drug testing			0.619** (0.132)		0.649** (0.134)
	EAP				0.787 (0.166)	0.787 (0.161)

* Statistically significant at the 90% level; ** significant at 95%; *** significant at 99% level.
[a] Models also control for 2-digit industry, 3-digit industry injury rate, workers' compensation benefits, occupational and gender composition of 3-digit industry, and log earnings of production workers in industry.
[b] Column numbers in Tables 2 and 3 refer to different specifications — without distinguishing between the different anti-drug programs (column 1); only examining drug policy and drug testing (columns 2 and 3); only examining EAPs (column 4); controlling for all three programs (column 5).

Table 3
Incidence rate ratios from negative binomial model of lost-work injuries[a].
(Std. error in parentheses).

Sample	Program	Model 1[b]	Model 2	Model 3	Model 4	Model 5
All:N = 1405	Any program	0.995 (0.068)				
	Drug policy		0.996 (0.052)	1.031 (0.057)		1.043 (0.058)
	Drug testing			0.909* (0.053)		0.922 (0.054)
	EAP				0.909 (0.053)	0.923 (0.056)
Emp ≥ 50; N = 1334	Any program	0.937 (0.064)				
	Drug policy		0.963 (0.050)	0.991 (0.055)		1.006 (0.057)
	Drug testing			0.924 (0.054)		0.933 (0.055)
	EAP				0.913 (0.053)	0.925 (0.055)
Emp ≥ 100; N = 1251	Any program	0.906 (0.064)				
	Drug policy		0.941 (0.049)	0.968 (0.054)		1.020 (0.059)
	Drug testing			0.929 (0.055)		0.935 (0.055)
	EAP				0.919 (0.054)	0.936 (0.058)
Emp ≥ 500; N = 897	Any program	0.828** (0.070)				
	Drug policy		0.879** (0.048)	0.870** (0.049)		0.885** (0.050)
	Drug testing			1.025 (0.064)		1.027 (0.064)
	EAP				0.897 (0.062)	0.920 (0.065)
Manuf = 1; N = 565	Any program	0.946 (0.098)				
	Drug policy		1.059 (0.083)	1.111 (0.101)		1.143 (0.106)
	Drug testing			0.910 (0.080)		0.933 (0.081)
	EAP				0.870 (0.077)	0.854* (0.079)
TCPU = 1; N = 212	Any program	1.164 (0.306)				
	Drug policy		1.252 (0.224)	1.192 (0.241)		1.299 (0.256)
	Drug testing			1.088 (0.197)		1.123 (0.199)
	EAP				0.678** (0.128)	0.626*** (0.115)

* Statistically significant at the 90% level; ** significant at 95%; *** significant at 99% level.
[a] Models also control for 2-digit industry, 3-digit industry injury rate, workers' compensation benefits, occupational and gender composition of 3-digit industry, and log earnings of production workers in industry.
[b] Column numbers in Tables 2 and 3 refer to different specifications — without distinguishing between the different anti-drug programs (column 1); only examining drug policy and drug testing (columns 2 and 3); only examining EAPs (column 4); controlling for all three programs (column 5).

industry. Establishments in the TCPU industry with a formal drug policy had a significantly higher NLW injury rate than those without such a policy but this association was not observed for other subsamples or in the full sample.

Workplace anti-drug programs were not consistently associated with the rate of more serious injuries involving lost work in Table 3. Drug testing was associated with a marginally significant 9% reduction in the LWD rate in the full sample, but this relationship fell below standard significance thresholds when different size classes or industries were analyzed separately and when models also controlled for the provision of EAPs. EAPs were associated with significant reduction in LWD injury rate of approximately 37% and 15% for the TCPU and manufacturing industries respectively (column 5) but this relationship was not obtained in the full sample, and for analyses by size classes. Finally, among establishments with over 500 employees, those with a formal drug policy had significantly lower rates of LWD injuries with reductions of approximately 11.5% in models that also controlled for the use drug testing and EAPs. At the same time, formal drug policies had no significant relationship with LWD injuries in the full sample or for smaller size classes.

Table 4 reports the association between EAP characteristics and injury rates for those establishments with EAPs. Relative to management-sponsored EAPs (the reference group), firms whose EAPs involved union collaboration reported approximately 20% higher rates of NLW and LWD injuries. For NLW injuries, this relationship was significant among the largest firms with over 500 employees while for LWD injuries, this relationship appeared strongest in the TCPU industry. Relative to firms whose EAPs were staffed by company employees (most likely on-site EAPs), those with EAPs run by outside contractors (most likely

Table 4
Relative risk ratios for EAP characteristics in negative binomial injury rate models for establishments with EAPs[a].

	All (N = 876)	≥500 employees; N = 675	Manufacturing; N = 395	TCPU; N = 152
No-lost-work injury rate				
Sponsor (Base = company management)				
Union-management collaboration	1.196** (0.110)	1.259** (0.134)	1.134 (0.128)	0.872 (0.158)
Other	1.226 (0.369)	1.385 (0.504)	1.139 (0.504)	1.069 (0.276)
Outside staff (Base = company employees)	1.138* (0.085)	1.219** (0.101)	1.063 (0.099)	1.301 (0.242)
Telephone hotline	1.012 (0.079)	1.023 (0.087)	0.954 (0.096)	1.043 (0.185)
No drug services	0.604 (0.458)	0.720 (0.549)	0.924 (0.824)	–
Lost work injury rate				
Sponsorship (Base = company management)				
Union-management collaboration	1.198** (0.098)	1.069 (0.095)	1.0002 (0.099)	1.332** (0.187)
Other	0.265* (0.157)	1.187 (0.182)	0.988 (0.262)	0.678 (0.233)
Outside staff (Base = company employees)	1.208***(0.076)	1.199***(0.082)	1.147 (0.099)	1.191 (0.186)
Telephone hotline	0.904 (0.057)	0.926 (0.060)	0.834** (0.075)	0.809 (0.134)
No drug services	1.071 (0.313)	0.997 (0.475)	1.603** (0.378)	–

* Statistically significant at the 90% level; ** significant at 95%; *** significant at 99% level.
[a] Models also control for 2-digit industry, 3-digit industry injury rate, workers' compensation benefits, occupational and gender composition of 3-digit industry, and log earnings of production workers in industry.

off-site) had 14% and 21% higher reported rates of NLW and LWD injuries respectively and this positive association with injury rates was also observed among establishments with over 500 employees. EAPs with telephone hotline services were associated with 17% and 19% lower LWD rates in manufacturing and TCPU industries, albeit insignificantly in the latter possible due to small sample. EAPs in the manufacturing industry that did not offer any drug-related services including drug education, counseling, referrals or follow-ups had significantly higher LWD injury rates but no significant association with NLW rates.

Summary and discussion

Safety concerns have been a powerful force behind the use of workplace anti-drug programs, yet little research has examined whether establishments with such programs have better safety records than firms without. This study sheds light on the safety implications of three primary components of a drug-free workplace program: EAP, formal workplace drug policy, and drug testing.

In this study, the use of drug testing is associated with a significant 15% reduction respectively, in the rate of minor NLW injuries in the full sample but not consistently associated with more serious LWD injuries. Establishments with EAPs had 14% lower NLW rate in the full sample and similar reductions in NLW and LWD injuries in the manufacturing industry. Additionally, EAPs were associated with a 37% reduction in LWD rate in the TCPU industry. LWD injuries appear to be responsive to specific EAP characteristics. In particular, management sponsorship of EAPs and company staffed EAPs (most likely onsite) are both associated with significantly lower rates of lost-work injuries. EAP telephone hotlines are also associated with a lower lost-workday injury rate in industry analyses.

Our results are consistent with several scenarios. Drug testing may screen out problem employees resulting in a safer workforce [because more establishments tested job applicants rather than employees (U.S. Department of Labor, 1989)]. Company-staffed EAPs may involve closer interaction between EAP providers and workplace supervisors leading to more timely interventions when necessary (Levy Merrick et al., 2007). Provision of telephone hotlines may reduce stigma, supplement face-to-face counseling, and increase access to help for drug or alcohol problems for those with mobility or scheduling problems. Our results are consistent with a study by Attridge (2003), which documents a 62% reduction in absenteeism for employees who used an EAP with primarily telephonic services.

At the same time, if establishments performing risky operations are more likely to proactively address substance use via testing and EAPs, then the estimated reductions in injury rates may underestimate the true safety effects of these workplace anti-drug efforts. Conversely, firms with such programs may be inherently more safety conscious in their work operations than other firms in ways that are not measured in our data, resulting in an apparent “effect” of their anti-drug efforts on injury rates. Longitudinal data on establishments would allow us to control better for workplace characteristics that may have been correlated with both the adoption of anti-drug programs and with injury rates.

Problems with recording injuries in the SOII may also result in overstating injury rate reductions associated with drug testing. Estimates of the SOII undercount range from 20% to 70%, depending on study methodology (Ruser, 2008). A recent study of Washington State employers' adherence to OSHA recordkeeping guidelines classified 38% of those surveyed as under-reporters with many employers failing to record injuries until a workers' compensation claim had been resolved (Wuellner & Bonauto, 2014). A report by the General Accounting Office on the SOII listed several worker and employer incentives in favor of underreporting injuries including mandatory drug testing following an incident in some industries; fear of losing safety awards; employers' desire to avoid higher rates of workers' compensation insurance; and small employers' confusion with recordkeeping guidelines (U.S. Government Accountability Office, 2009). This latter factor suggests that undercounting is a bigger problem in small firms and may account for the difference in our results between small and large firms. If underreporting is also more likely for less severe NLW injuries, it may result in overstating NLW rate reductions associated with drug testing and explain the relative lack of significance of drug testing for more serious DAFW cases that are less likely to be undercounted.

This study has several strengths. While research has documented cost savings associated with EAPs, only three studies with conflicting results focus on their relationship with workplace injury. Our findings on EAPs' association with injury rates are especially important, representing just the second multi-firm study of that issue. Few, if any, analyses provide information on whether and how specific EAP characteristics relate to workplace safety. This study responds to the National Research Council recommendations that, given the wide variation in EAPs, particular EAP services and characteristics should be studied rather than whole programs to better understand their impact on workplace outcomes (Normand et al., 1994).

The majority of drug testing studies does not explicitly relate a firm's performance to its adoption of testing programs, but rather relate a positive drug test result (i.e., drug use) to subsequent worker behavior. Thus, workers testing positive on pre-employment drug tests have been found to have a higher risk of injury (Zwerling, Ryan, & Orav, 1990), more absenteeism, and a greater risk of being fired (Blank & Fenton, 1989; Normand, Salyards, & Mahoney, 1990). The few studies of for-cause drug testing similarly related a positive drug test result with a greater use of sick leave and a higher risk of vehicle crashes (Crouch, Webb, Peterson, Buller, & Rollins, 1989; Sheridan & Winkler, 1989). Existing studies of the associations between anti-drug programs and workplace outcomes including injury often rely on data from a single company (Ozminkowski et al., 2003), making them unrepresentative. Instead, this current study uses linked survey data on anti-drug programs and workplace injuries in over 1400 establishments in different industries and size classes, adding to the body of evidence on this issue. Finally, the availability of information on EAP provision combined with drug testing and drug policy data allow us to highlight the separate associations between workplace injury and the three anti-drug program components.

Our results are limited because our data come from the late 1980s when random drug testing was less prevalent in the workplace and EAPs were primarily focused on substance abuse problems. Since then, EAPs have expanded their mission to include an array of family services and other work-life products or have moved toward integration with managed behavioral health care organizations. While our results remain relevant to current EAPs, which still regard addressing substance abuse problems in the workplace as a core priority (Bennett & Attridge, 2008), our data may not reflect the organizational structure and expanded focus of current EAPs. For example, if integrated service providers have less expertise in workplace-specific substance abuse prevention or have less interaction with supervisors, EAPs may be less successful in identifying and intervening in problems in a timely fashion (Masi, Altman, Benyon, Healy, & McCann, 2004). On the other hand, anecdotal evidence suggests that telephone hotlines work especially well in EAPs with an expanded list of services other than substance abuse prevention because of the reduced stigma associated with seeking help from the EAP (Vickers, 2000). More recent data would show whether the evolution of EAPs has altered their relationship with workplace injury while also reflecting the vast changes in the workplace, with almost 2 million workers in temporary employment positions who may not have access to such benefits.

The data sets used in this research were only accessible in a secured Bureau of Labor Statistics facility, which we no longer can readily access. That prevented us from analyzing the differences in characteristics of employers that had reported injuries versus ones with a zero count. A potential under-reporting bias might arise if employers with zero counts were concentrated in one establishment size and one drug program category.

Finally, the linked data in our analytic sample were disproportionately from larger firms that report higher use of formal drug policies, drug testing, and EAPs than average. The establishment-level data lacked information about the workers' characteristics such as age, gender, and occupation, all factors that could affect workplace injury rates. We also could not develop national weights from a data set consisting of establishments included in the two independent stratified random sample surveys because weights in the SEADP were not available.

Despite these limitations, this study provides insight into the relative importance for workplace safety of drug testing, EAPs, and formal policy on drug use. Our results suggest that EAPs may be effective in improving workplace safety especially in the TCPU industry.

Practical applications

This associational study suggests that employers may be able to reduce their workplace injury rates by having company-staffed EAPs and providing telephonic EAP services to their employees. Drug testing may also reduce injury rates, although it is unclear to what extent that is due to employee sorting versus a protective effect on those employed.

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