

Employer Policies Toward Guns and the Risk of Homicide in the Workplace

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This population-based case-control study of North Carolina workplaces evaluated the hypothesis that employers' policies allowing firearms in the workplace may increase workers' risk of homicide. Workplaces where guns were permitted were about 5 times as likely to experience a homicide as those where all weapons were prohibited (adjusted odds ratio=4.81; 95% confidence interval=1.70, 13.65). The association remained after adjustment for other risk factors. The findings suggest that policies allowing guns in the workplace might increase workers' risk of homicide. (*Am J Public Health*. 2005;95:830-832. doi: 10.2105/AJPH.2003.033535)

Although many Americans keep guns for protection,^{1,2} some research suggests that possession of a gun may increase, rather than decrease, the risk of becoming a victim of violence.³⁻⁵ Studies to date have focused on guns in the home,^{3,4} although firearms are also kept in other settings, such as workplaces and public areas. Workplaces are important because most adults spend a signifi-

cant portion of their time at work and because violence is a leading cause of death for US workers.⁶⁻¹⁰ The effects of guns in the workplace have not been evaluated, but policies explicitly allowing workers to keep guns for protection on the job have been debated.¹¹

In accordance with findings about the risks associated with guns in the home, we hypothesized that policies allowing guns in the workplace may increase the risk of homicide for workers. To evaluate this hypothesis, we conducted a case-control study of on-the-job homicide in North Carolina workplaces.

METHODS

Details of the study methods have been published elsewhere.^{12,13} Briefly, the units of study were workplaces rather than workers. Cases were 105 North Carolina workplaces where a worker was a victim of homicide between 1994 and 1998 and controls (2 per case) were randomly selected workplaces that were in operation in the month of a case event and were frequency matched to cases by industry sector.

Data on potential risk and preventive factors were collected by telephone interview. The interview included questions about whether employees were allowed to have guns, knives, bats, chemical sprays, or at least 1 type of weapon with them while at work. Possible responses included the following: (1) the weapon was specifically allowed, (2) the weapon was prohibited, (3) the employer did not have a formal policy toward that weapon, or (4) the respondent did not know the employer's policy. The design of the study facilitated examination of workplace-level policies but did not allow for questions about individuals, such as whether employees brought weapons to work and whether workers' weapons were used in violent events.

To examine the effects of employers' policies toward weapons, we contrasted workplaces with policies that specifically permitted weapons with those with policies that specifically disallowed weapons. Data were analyzed by logistic regression, and the exposure odds ratio (OR) and 95% confidence in-

terval (CI) were used to assess the risk of homicide associated with employers' policies toward weapons. Odds ratios were adjusted for other risk and preventive factors identified from previous analyses based on the same data,^{12,13} including 7 variables for workplace characteristics and 4 variables for control measures (see footnotes a and b in Table 2). Conditional logistic regression was used initially to account for the matching on industry sector, but unmatched analyses (unconditional logistic regression) yielded similar point and interval estimates; thus, only results from the more robust unconditional models are shown here.

RESULTS

Respondents from 91 case workplaces and 205 control workplaces provided data on employers' policies toward weapons. The other 14 case and 5 control respondents either did not know the employer's policy or refused to answer.

Eighty-seven case and 177 control workplaces had explicit policies toward weapons. When the effect of employers' policies on homicide risk was examined without taking other factors into account, worker homicides were approximately 3 times as likely in workplaces that permitted at least 1 type of weapon as in those that prohibited all weapons (Table 1). A relatively small increase in the risk of homicide was observed for workplaces that prohibited guns but allowed other kinds of weapons. In contrast, there was a nearly 7-fold increase in the risk of a worker being killed in workplaces that allowed guns.

Adjustment for other predictors of homicide risk had little effect on the association with employers' policies toward all weapons or weapons other than guns (Table 2). However, simultaneous adjustment for workplace characteristics and control measures reduced the odds ratio for policies allowing guns from 6.83 to 4.81 (95% CI=1.70, 13.65).

Four additional case workplaces and 28 other control workplaces had no explicit policies toward weapons. These workplaces were added to the analysis to examine the effect of not having policies prohibiting weapons, relative to prohibiting them. The fully adjusted odds ratios for not prohibiting any weapons,

TABLE 1—Unadjusted Association of Employers' Policies Toward Weapons in the Workplace^a With the Risk of Homicide for Workers

	Cases	Controls	OR (95% CI)
No weapons allowed	30	110	Referent
Allowed at least one type of weapon	57	67	3.12 (1.82, 5.33)
Allowed only weapons other than guns	16	42	1.40 (0.69, 2.82)
Allowed guns	41	22	6.83 (3.54, 13.18)

Note. OR = odds ratio; CI = confidence interval.

^aIncludes 87 case and 177 control workplaces for which data indicated that the employer had a specific policy toward weapons.

TABLE 2—Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for Association of Employers' Policies Toward Weapons in the Workplace^a With the Risk of Homicide for Workers, Adjusted for Workplace Characteristics and Control Measures

Adjustments	Allowed at Least 1 Type of Weapon	Allowed Weapons Other Than Guns	Allowed Guns
	OR ^b (95% CI)	OR ^b (95% CI)	OR ^b (95% CI)
Workplace characteristics ^c	2.57 (1.24, 5.32)	1.30 (0.53, 3.21)	5.67 (2.09, 15.35)
Control measures ^d	2.82 (1.60, 5.00)	1.35 (0.64, 2.84)	6.40 (3.13, 13.08)
Workplace characteristics and control measures	2.38 (1.12, 5.06)	1.39 (0.53, 3.62)	4.81 (1.70, 13.65)

^aIncludes 87 case and 177 control workplaces for which data indicated that the employer had a specific policy toward weapons.

^bReference category is no weapons allowed.

^cHigh-risk industry, night hours, residential or industrial location, less than 2 years in current location, only 1 worker, majority male workers, majority non-White workers (see Loomis et al.¹²).

^dClosed or locked entrances, bright lighting, alarms, multiple workers normally on duty (see Loomis et al.¹³).

not prohibiting weapons other than guns, and not prohibiting guns were 2.2 (95% CI=1.1, 4.5), 1.4 (95% CI=0.6, 3.5), and 3.6 (95% CI=1.3, 9.6), respectively.

DISCUSSION

In this study, the risk of a worker being killed at work was substantially higher in workplaces where employer policy allowed workers to keep guns: workplaces where guns were specifically permitted were 5 to 7 times more likely to be the site of a worker homicide relative to those where all weapons were prohibited. Only a small increase in the risk of homicide was associated with workplaces that allowed weapons other than guns. After we adjusted for workplace characteristics and preventive measures, further analysis suggested that the increased risk associated with employer policies allowing guns was not completely explained by either

characteristics of the workplace that may be indicative of its inherent "riskiness" or employers' failure to adopt recommended protections.

Employers' reasons for allowing guns in the workplace are unknown, but the belief that firearms offer protection against crime is one possible motive. If employers set policies toward weapons in response to their experience with crime, then the workplaces at highest risk for crime also might be those most likely to allow guns. In response to this possibility, some studies have incorporated adjustments for history of crime as a potential confounder.¹⁴ Although we collected data on workplaces' experience with robbery and violent crime, we did not control for it in the models presented here because adjustment for a determinant of exposure generally is not appropriate.¹⁵ However, exploratory analyses showed that if history of crime were controlled as a confounder, the

fully adjusted odds ratio for policies allowing guns would have been 7.89 (95% CI=2.44, 25.46).

This study was limited by the nature of the data available on workers' exposure to guns. We generally did not know how often employees had guns at work, whether workers' guns were used during the fatal events, and whether perpetrators came armed or used the victims' own weapons. The inability to examine workers' or perpetrators' actions limited the ability of the current study to look beyond employers' policies. Further research is warranted to resolve questions this study could not answer, including those related to workers' actual possession or use of weapons and the behavior of individuals during violent events.

Our data suggest that, much as residents of households with guns are more likely to become victims of homicide,^{4,5} workers in places where the employer's policy allows guns may have a higher chance of being killed at work. These findings bear directly on policy for workplace safety. In light of the evidence, it is reasonable to question the costs and benefits of policies permitting firearms in the workplace. ■

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Contributors

D. Loomis originated the project, oversaw its execution, performed statistical analyses, and drafted the brief. S. W. Marshall participated in the development and conduct of the project, provided statistical guidance, and contributed to the drafting and revision of the brief. M. L. Ta conducted background research and contributed to the drafting and revision of the brief.

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Human Participant Protection

All procedures involving human subjects were reviewed and approved by the institutional review board of the University of North Carolina School of Public Health.

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