
Contrasting Robbery- and Non-Robbery-Related Workplace Homicide

North Carolina, 1994–2003

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Background: Most research regarding the perpetration of occupational homicide has focused on robbery-related violence; relatively little is known about the circumstances surrounding non-robbery-related occupational homicides and interventions that may prevent these events. A case series was assembled and utilized to examine occupational homicides that were and were not motivated by robbery to determine if select characteristics of the events differed according to the perpetrator's motivation for the crime and relationship to the workplace.

Methods: Information on occupational homicides that occurred in North Carolina from 1994 to 2003 was abstracted from medical examiners' records and death certificates and was obtained by interviews with law-enforcement officers and from newspaper accounts (data collection occurred in 1996–2001 and 2003–2007). Each homicide was classified by motive and the perpetrator's relationship to the workplace and its employees. Characteristics of robbery-motivated and non-robbery-motivated homicides were compared. Analysis was conducted in 2006 and 2007.

Results: Most occupational homicides occurred during robbery of the workplace (64%). However, 36% of occupational homicides during the study period were not robbery-related. Strangers perpetrated 73% of robbery-related killings but only 11% of non-robbery-related homicides. Homicides unrelated to robbery occurred in several industrial sectors, including retail (28%); service (26%); and manufacturing (22%), whereas robbery-related homicides occurred overwhelmingly in retail (67%). The type of firearm used to perpetrate these killings differed by the perpetrator's relationship to the workplace.

Conclusions: Non-robbery-related homicides constitute a meaningful proportion of occupational homicides, and the characteristics of these cases can differ from those that are robbery-related. The current system by which workplace homicides are classified could be expanded to include robbery motivation. Efforts to examine occupational-homicide-prevention strategies for non-robbery-related homicides are important.
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Introduction

The WHO has recognized an increase in intentional injuries throughout the world and has identified violence as an international public health problem.¹ In the U.S., homicide is one of the leading causes of death among those aged <45 years,

and the workplace is an important venue in which violent crime occurs.^{2,3}

Americans spend a great deal of time in the workplace, and violence accounts for a notable portion of workplace injury.^{3,4} Violence is the second-leading cause of fatal occupational injury among women and the third-leading cause of such deaths among men.³ Consequently, a need

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exists for epidemiologic studies characterizing the circumstances of workplace violence.⁵

As part of a comprehensive approach to develop strategies for reducing workplace violence, the California Department of Industrial Relations developed a way to categorize violence based on perpetrator motive.^{6,7} Type-I violence is committed by perpetrators without a prior relationship with the workplace or its employees who enter the workplace to commit a crime. Type-II violence occurs when a recipient of service assaults an employee (e.g., a patient attacking a healthcare provider). Violent acts perpetrated by people employed by the workplace or known to employees through a personal relationship are categorized as Type III. The initial typology was subsequently expanded by subdividing Type-III events so that violence perpetrated by past or current employees is classified as Type III and events involving perpetrators known personally to an employee (e.g., via friendship, familial relationship, or intimate partnership) fall under Type IV.⁸

Research on workplace homicides has focused largely on robbery-related violence.^{9–16} Less is known about non-robbery-related workplace homicide. This study epidemiologically describes occupational homicides in North Carolina in the years 1994–2003, comparing robbery-related and non-robbery-related incidents. To achieve this goal, an expanded typology of workplace violence was applied that included robbery as a motive.

Methods

Reviewed for this study were all North Carolina medical examiners' cases that occurred from 1994 to 2003 with the manner of death indicated as homicide. To identify cases that could be work-related, all victims aged ≥ 10 years were included in the review. North Carolina law requires that all deaths resulting from injury be investigated by a medical examiner and that a report be filed in the North Carolina Office of the Chief Medical Examiner (NCOCME). A list of homicides was obtained from the NCOCME, and all medical examiners' reports and death certificates were reviewed for information about the location of the onset of injury. Cases qualified for inclusion if they resulted from injuries occurring at work in North Carolina and death resulted within 365 days. To them were applied criteria from the *Operational Guidelines for Determination of Injury at Work*, developed and disseminated by the Association for Vital Records and Health Statistics (now the National Association for Public Health Statistics and Information Systems); the National Institute for Occupational Safety and Health; the National Center for Health Statistics; and the National Center for Environmental Health.¹⁷ These guidelines were developed in 1992 to create criteria by which to judge whether a fatal event was work-related.¹⁸

Records from the NCOCME for fatal injuries occurring at work and those that might have occurred at work (based on the record) were abstracted. If the record contained information suggesting that a victim may have been at work at the

time of injury but this determination could not be made with confidence, law-enforcement officers who investigated the homicide were interviewed, newspaper accounts were consulted, or both. Based on this additional information, questionable homicides were classified.

All homicides ($n=228$) with *yes* in the on-the-job box on the death certificate, all those classified as on-the-job in the medical examiner's report, or both, were included in the study. Twenty-nine additional cases met the criteria for occurring at work, based on information garnered from newspaper accounts and law-enforcement agents; 12 more were determined to have occurred at work based on information contained in the medical examiner's report despite the on-the-job field being marked *no*, *unknown*, or left blank on the death certificate and medical examiner's report.

The workplace was the unit of analysis; single events that resulted in multiple homicides were included once. Homicides involving workplaces classified as police protection or national security were excluded.¹⁹

Each homicide was categorized according to both the perpetrator's motive and relationship to the workplace or its employees:

- Motive: Homicides for which the motive was robbery or was strongly suspected by law enforcement to be robbery versus cases in which robbery was known not to be the motive
- Event type: Type I (perpetrator had no relationship with the workplace); Type II (perpetrator was a customer); Type III (perpetrator was an employee); or Type IV (perpetrator was personally known to an employee)

Table 1 provides scenarios for robbery-related and non-robbery-related homicides classified in each of the four categories.

When multiple motives were mentioned, the primary motive for the crime—in the opinion of the law-enforcement officer—was utilized for classification. For example, when the primary intent of the perpetrator was to assault an estranged partner, the motive was classified as non-robbery-related even if money was stolen during the commission of the crime. If the event could be assigned to two categories, it was assigned to the one thought to have greater influence on the homicide's occurring at that particular time and place, although both relationships likely influenced the motivation for the homicide. For example, an event in which the perpetrator was both sibling and coworker of the victim could be classified as both Type III and Type IV. For this analysis, such a case was assigned to Type III, because the coworker relationship is what brought the perpetrator and victim to the location at which the homicide occurred.

Events were classified as Type I when the presumed purpose for the perpetrator's going to the workplace was solely criminal intent and no relationship existed between the perpetrator and the workplace or its employees. For robberies, this included events during which the perpetrator posed as a customer. Events in which victims appeared to be selected at random also were assigned to Type I. For example, if no relationship between the perpetrator and victim was identified following a drive-by shooting, the case was classified as non-robbery-related Type I.

The collected data included information regarding weaponry and the day and time of onset of injury. Workplaces were

Table 1. Representative scenarios resulting in occupational homicide, by type (North Carolina, 1994–2003)

Type	Perpetrator's relationship to workplace	Motive	
		Robbery-related	Non-robbery-related
I	No prior relationship	A perpetrator(s) selects a place of business to which he or she has no connection. With the intent to take cash from the establishment, the suspect robs the business and kills those employees present to prevent his or her identity from being revealed by the victim(s).	An employee performing his or her job is fatally injured during a random act of violence committed by a perpetrator with no relationship to either the workplace or the victim. The motive in the crime is not robbery and is unrelated to the work being performed. A specific example includes a drive-by shooting in which victim selection was random.
II	Customer or client	A customer enters a business and utilizes the services offered by the establishment. After a legitimate service has been provided to the customer, he or she commits a robbery in which an employee is fatally wounded.	A customer begins to behave in a way inconsistent with tolerable behavior as defined by the business management. Steps are taken to remove the customer from the premises, and a dispute ensues between the employee and the patron being removed. The event escalates to the point at which the patron intentionally injures the employee fatally.
III	Former or current employee	A former employee of the business, familiar with both the environmental layout and administrative practices of the business, robs his or her former employer and fatally wounds an employee in the process.	Two employees have a history of discord in the workplace. The tension escalates to the point where one employee inflicts a fatal injury on the other.
IV	Personal relationship with an employee	A friend of an employee of the business, having some knowledge of the business and its practices, targets the establishment. During the robbery, that on-duty employee is fatally injured.	An employee involved in an intimate relationship in which a dispute has occurred comes to the workplace to perform his or her job. The employee's partner, aware of the partner's working situation, waits in the parking lot for the employee to emerge from the workplace. The dispute continues in the parking lot, escalating to a fatal injury's being inflicted on the employee.

classified by the Standard Industrial Classification system: agriculture; mining; construction; manufacturing; transportation, communication, and utilities; wholesale trade; retail; finance, insurance, and real estate; services; and public administration.¹⁹ Data collection occurred during 1996–2001 and 2003–2007.

Frequencies were tabulated and chi-square analyses conducted to test for differences between robbery-related and non-robbery-related homicides. When expected cell counts were ≤ 5 , Fisher's exact test was used.²⁰ When the chi-square statistic was not valid due to small cell counts but the computational time and memory necessary for exact methods were substantial because of large numbers of table rows and columns, Monte Carlo estimates of the exact *p*-values were computed.²¹ All analyses, conducted during 2006 and 2007, were performed in SAS version 9.1.

Results

Of the 7128 homicides reviewed, 269 met the inclusion criteria for workplace homicide. Exclusions included workplace homicides that occurred in law enforcement ($n=20$) and the military ($n=5$). Of those 269 events, 169 (63%) were classified as motivated by robbery, and 96 (36%) were not. Motive could not be classified for four (1%) homicides.

Robbery-related and non-robbery-related homicides were classified by type (Table 2). For 18% (31/169) of the robbery-related homicides, the perpetrator's relationship to the workplace could not be identified and was classified as unknown. Eleven cases could have been assigned to more than one category, indicating that the categories of this typology are not mutually exclusive, although only one category was used for each case in the analysis.

Typology differed significantly ($p<0.01$) between robbery-related and non-robbery-related homicides. Perpetrators having no legitimate relationship with the workplace (Type I) committed >70% of the robbery-related homicides (Table 2). In contrast, 89% ($n=85$) of the non-robbery-related homicides involved perpetrators with a relationship (Types II–IV) with the workplace or an employee. Although robbery-related homicides are typically classified as Type-I events, 9% of robbery-related homicides were classified as Type II, III, or IV, and 11% of non-robbery-related homicides were classified as Type I.

Customers of the workplace (Type II) perpetrated 27% of non-robbery-related homicides but only one of the robbery-related events (Table 2). These incidents occurred most frequently in the retail ($n=10$) and service ($n=10$) industries. Homicides also occurred in real estate ($n=4$); manufacturing ($n=1$); and transportation ($n=1$). For Type-II homicides, employees were most often ($n=10$) fatally injured while breaking up an altercation or removing a customer from the business.

Of the 12 robbery-related Type-III homicides, one involved two perpetrators (one current and one former

employee) and was excluded from the following analysis. Among the remaining Type-III homicides, the perpetrator's employment status differed significantly (exact $p=0.04$) between robbery-related and non-robbery-related incidents. Among non-robbery-related Type-III homicides, 84% of perpetrators were currently employed at the workplace, while current employees perpetrated only 45% of robbery-related Type-III homicides (Table 2).

Intimate partners committed the majority (85%) of the non-robbery-related Type-IV homicides (Table 2). Other relationships classified as non-robbery-related Type IV included family members ($n=1$) and close personal relations ($n=4$) such as friends and former employers. In the one robbery-related Type-IV homicide, the perpetrator was a familial relation of the victim.

Industrial sectors affected by occupational homicide differed significantly (exact $p<0.01$) by the four com-

Table 2. Occupational homicides^a by motive and relationship of the perpetrator to the workplace (North Carolina, 1994–2003)

Type	Perpetrator's relationship to the workplace or its employees	Motive	
		Robbery-related <i>n</i> (%)	Non-robbery-related <i>n</i> (%)
I	Criminal intent: no legitimate relationship with the workplace or its employees	124 (73)	11 (11)
II	Customer or client of the workplace	1 (1)	26 (27)
III	Employee of the workplace		
	Current employee	5 (3)	21 (22)
	Former employee	6 (4)	4 (4)
	Current and former employee involved	1 (1)	—
IV	Personal relationship with an employee		
	Intimate partner	—	29 (30)
	Familial relation	1 (1)	1 (1)
	Other	—	4 (4)
—	Unknown	31 (18)	—
Total		169	96

^aOf the 269 total occupational homicides, motive could not be determined for four cases.

binated categories of robbery and typology (Table 3^{8,9,20}). The majority of robbery-related homicides occurred in retail (Type I, 67%; Types II–IV, 71%) and transportation (Type I, 20%; Types II–IV, 14%), whereas non-robbery-related homicides were distributed across all industries, with concentrations in the retail sector (Type I, 45%; Types II–IV, 26%); service sector (Type I, 18%; Types II–IV, 27%); and manufacturing sector (Type I, 0%;

Table 3. Select characteristics of occupational homicides by motive and typology^{8,9} (North Carolina, 1994–2003)

	Robbery-related		Non-robbery-related		Total <i>n</i>	Exact <i>p</i> -value
	Type I ^a <i>n</i> (%)	Types II–IV ^a <i>n</i> (%)	Type I ^a <i>n</i> (%)	Types II–IV ^a <i>n</i> (%)		
Industry (standard industrial classification)²⁰						< 0.01
Agriculture	0	0	0	5 (6)	5 (2)	
Mining	0	0	1 (5)	0	1 (0)	
Construction	2 (2)	0	1 (5)	1 (1)	4 (2)	
Manufacturing	1 (1)	1 (7)	0	21 (25)	23 (10)	
Transportation, communication, utilities	24 (20)	2 (14)	1 (9)	3 (4)	30 (13)	
Wholesale trade	0	0	0	1 (1)	1 (0)	
Retail	83 (67)	10 (71)	5 (45)	22 (26)	120 (51)	
Finance, insurance, real estate	2 (2)	0	1 (9)	7 (8)	10 (4)	
Services	12 (10)	1 (7)	2 (18)	23 (27)	38 (16)	
Public administration	0	0	0	2 (2)	2 (1)	
Time of week						0.45
Weekday (6:00 AM Monday–5:59 PM Friday)	86 (71)	6 (50)	7 (64)	55 (66)	154 (68)	
Weekend (6:00 PM Friday–5:59 AM Monday)	35 (29)	6 (50)	4 (36)	28 (34)	73 (32)	
Unknown	3	2	0	2	7	
Time of event						0.32
6:00 PM–5:59 AM	76 (70)	7 (58)	5 (45)	51 (62)	139 (65)	
6:00 AM–5:59 PM	33 (30)	5 (42)	6 (55)	31 (38)	75 (35)	
Unknown	15	2	0	3	20	
Weapon (Multiples weapons possible)						
Firearm	100 (81)	11 (79)	10 (91)	74 (87)	195 (83)	0.62
Sharp instrument	11 (9)	1 (7)	1 (9)	8 (9)	21 (9)	1.00
Blunt force	9 (7)	1 (7)	0	4 (5)	14 (6)	0.83
Bodily force	3 (2)	1 (7)	0	2 (2)	6 (3)	0.54
Total events by category	124	14	11	85	234	

^aType I: perpetrator had no prior relationship with the workplace; Types II–IV: perpetrator had a relationship with the workplace or an employee.

Table 4. Type of firearm for occupational homicide (North Carolina, 1994–2003)

Type of firearm ^b	Motive		<i>p</i> -value	Workplace violence typology ^a				
	Robbery-related <i>n</i> (%)	Non-robbery-related <i>n</i> (%)		Type I <i>n</i> (%)	Type II <i>n</i> (%)	Type III <i>n</i> (%)	Type IV <i>n</i> (%)	Exact <i>p</i> -value
Handgun	65 (82)	51 (69)	0.06	54 (83)	12 (71)	13 (50)	22 (76)	0.01
Rifle	3 (4)	10 (14)		4 (6)	0	5 (19)	4 (14)	
Shotgun	11 (14)	13 (18)		7 (11)	5 (29)	8 (31)	3 (10)	

^aType I: perpetrator had no prior relationship with the workplace; Type II: perpetrator was a customer of the business; Type III: perpetrator was a current or former employee; Type IV: perpetrator was personally known to an employee.

^bType of firearm was unspecified for 70 of the 223 events in which a firearm was used.

Types II–IV, 25%). The non-robbery-related homicides that occurred in the retail sector were evenly distributed among the three types ($n=11$, $n=11$, and $n=10$, respectively, for Type II, III, and IV).

The time of onset of injury was known for 247 of the 269 cases (92%). Type-I robbery-related, Type-II–IV robbery-related, and Type-II–IV non-robbery-related homicides were more likely to occur at night, defined as 9:00 PM–5:59 AM (70%, 58%, and 62%, respectively). The percentage of homicides occurring during the weekend (defined as 6:00 PM Friday to 5:59 AM Monday) was greatest for Type-I, non-robbery-related homicides (50%), compared to the other three groups: Type-I robbery-related, 29%; Type-II–IV robbery-related, 36%; and Type-II–IV non-robbery-related, 34%.

The weapon most commonly used to inflict injury in each of these four combined categories of homicide was a firearm, responsible for more than three quarters of the homicides in each category (Table 3). For homicides in which the type of firearm and typology were known ($n=137$), handguns (74% overall) were most commonly used (Table 4). Although choice of firearm did not differ significantly between robbery-related and non-robbery-related homicides ($p=0.06$), it did vary significantly across the workplace-violence types (exact $p=0.01$). This difference is driven by the Type-III homicides in which only 50% were perpetrated with a handgun, compared to 83%, 71%, and 76% of Type-I, Type-II, and Type-IV events, respectively.

Discussion

Non-robbery-related homicides constitute a meaningful fraction of occupational homicides, and non-robbery-related and robbery-related homicides are distributed differently across violence typology and industry. Consequently, it may be useful to incorporate considerations of motive into the current typology.

The workplace-violence typology has been suggested to focus research and intervention development.^{6–8} However, categories in the current system are not mutually exclusive, and a high level of diversity exists within each category. Both pose challenges for developing comprehensive yet individualized interventions. Approaches aimed at homicide as a whole may be

effective for only a portion of events, making program development and evaluation difficult.

Robberies have been the most-studied occupational-homicide event, and the kind for which most intervention strategies have been assessed.^{9–13,15,16,22,23} This study demonstrates that homicides in which the perpetrator enters the workplace with only criminal intent do not always involve robbery and that robbery can motivate a homicide by a perpetrator who has a relationship with the workplace or an employee. Although most robbery-related homicides in this case-series study were Type-I events, 10% were classified as Type II, III, or IV because the perpetrator had a prior relationship with the workplace or its employees. Because robbers probably target workplaces and not employees specifically, victim selection (in this case, the workplace) is likely influenced by this prior connection. This distinction may be important during the development and evaluation of prevention strategies. Because those committing Type-II, -III, or -IV robbery-related homicides may have increased knowledge of the workplace compared to other perpetrators, prevention methods for these robberies may need to consider premeditating factors.

This study demonstrates the difference in the percentages of perpetrators who are strangers versus known to the workplace. Non-robbery-related homicides were more likely to be committed by perpetrators who had a relationship with the workplace or its employees. It is less likely that some strategies motivated by loss prevention, such as cash-handling procedures, would deter events such as interpersonal conflicts from occurring.²⁴ However, other strategies aimed at reducing robberies, such as visibility, lighting, and access control, may afford protection against non-robbery-related homicides. Assaults may be deterred or mitigated because of the perpetrator's fear of witnesses exterior to the workplace. Access can be denied to the entire worksite or to portions of it at particular times of day or during all operating hours. However, retailers, who constitute the sector most affected by both robbery-related and non-robbery-related homicides, are less likely to maintain complete control of access to the entire workplace because of the nature of the business. Thus, some

recommended strategies may have less impact in certain sectors.

The employment of robbery-prevention strategies may reduce assaults committed by customers, but these strategies are likely to be ineffective at preventing unpremeditated events fueled by conflict over services or goods. Recent recommendations from the National Institute for Occupational Safety and Health have been made specific to preventing homicides perpetrated by customers, including adequate staffing to meet customer needs and training in predicting and responding to both conflict and escalation to violence.²⁴

This study found that employees perpetrated only 10% (26/269) of non-robbery-related homicides—in contrast to the popular image that occupational homicide stems from disgruntled former employees exacting revenge (a scenario receiving disproportionate news media coverage). Current employees committed the majority (84%) of non-robbery-related Type-III homicides. Because this group of perpetrators inherently has access to the workplace, most previously recommended environmental violence-prevention strategies are likely ineffective.²⁵ Currently recommended strategies aimed at Type-III violence include screening potential employees, implementing training to communicate clearly to employees the company's violence definitions and policies, developing fair and equitable processes for termination, and requiring comprehensive reporting of acts and threats of violence.^{24,25}

Despite the fact that perpetrators of Type-IV violence potentially have increased knowledge of the workplace compared to a robber who is a stranger, strategies aimed at preventing robberies, such as access control and security devices, may be effective at reducing homicides resulting from intimate-partner violence.²⁵ Other recommended strategies include policies and training programs to extend workforce understanding of intimate-partner violence and to increase the willingness of employees to disclose violence to management.²⁴

Because strategies for reducing each type of homicide—particularly non-robbery-related violence—have gone largely unevaluated, previously and newly recommended strategies for such reduction need careful examination that addresses both the effectiveness of the strategies and the barriers to implementing them.

Not only do robbery-related and non-robbery-related workplace homicides differ by perpetrator, but these events also differ by industry. The industries most susceptible to homicide include retail, transportation, and service.³ Robbery-related homicides drive these trends, with most robbery-related homicides perpetrated against workplaces in the retail and transportation sectors, whereas non-robbery-related homicides are most likely to occur in the retail, service, and manufacturing industries. That most workplace homicides, both robbery-related and non-robbery-related, occur in retail is not surprising, because this sector is

the largest in North Carolina and throughout the nation. Yet every major industrial division experienced at least one non-robbery-related homicide over the study period. Thus, all workplaces could benefit from risk assessment that considers the types of violence to which they are vulnerable and the feasibility of implementing interventions—individualized for specific environments—that target that violence.

As with other homicides in the U.S., firearms play a prominent role in the perpetration of occupational homicides.²⁶ Firearms were used most often in this series of homicides regardless of robbery motive and the perpetrator's relationship to the workplace.²⁶ Although policies allowing firearms in the workplace have been examined, other workplace strategies to address firearm violence (e.g., metal detectors) are not well-evaluated and need additional study until successful strategies are identified to reduce firearm violence.²⁷

Despite investigators' efforts to assemble a complete case series, cases may have been missed. The method for identifying occupational homicides, however, minimized this possibility. Death certificates are typically the best single source for identifying fatal occupational injuries.²⁸ While homicides may be underreported as work-related injuries on death certificates, medical examiners' records for all homicides were also reviewed to determine at-work status. All injury deaths occurring in North Carolina require investigation by a medical examiner. Therefore, these records theoretically capture all homicides, and additional information was utilized regarding the event and perpetrators that was unavailable during the initial medical examiner's investigation.

Misclassification of motive and type are also possible limitations. Classification decisions were based on information provided by law enforcement, but supplemental information often could not be provided for cases not yet cleared by the legal system, a circumstance more often affecting recent cases. Officers who provided data, however, were cautious about not providing speculative information. Consequently, these data are likely valid, although errors remain possible.

Although homicide motivated by robbery is typically described as Type-I violence, robbery motivation can overlap categories of workplace violence, and not all Type-I homicides are motivated by robbery. Considerations about motive may improve homicide-intervention development. Nearly 40% of occupational homicides in this study were unrelated to robbery. Thus, current prevention strategies developed in the context of preventing robbery-related homicides may not address adequately the conditions that lead to a large fraction of other homicides in the workplace.

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