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**NACS Resource Book**

# **Convenience Store Security at the Millennium**

Rosemary J. Erickson, Ph.D.

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The logo for NACS Research Report, featuring a stylized graphic of vertical lines of varying heights above the text "NACS RESEARCH REPORT".

**NACS  
RESEARCH  
REPORT**

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# Convenience Store Security at the Millennium

by

Rosemary J. Erickson, Ph.D.

President

Athena Research Corporation

San Diego, CA

February, 1998

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# ABSTRACT

This paper reviews the literature on the state of the knowledge about the use of two clerks and other security measures to prevent robbery and violence in convenience stores and service stations. Dr. Rosemary J. Erickson, a sociologist, has studied the problem of convenience store security for over 25 years and undertook the task in order to draw together in one place what is known about the issue. The paper begins with the early research from the 1970s, conducted by Western Behavioral Sciences Institute and funded by the Department of Justice, which resulted in Southland's involvement, as the owner and operator of 7-Elevens. This research led to Southland's implementation of the program and their support of research in the area, including two large scale studies of armed robbers in prisons conducted by the Athena Research Corporation. The history also includes the role of the National Association of Convenience Stores (NACS) in funding research.

In addition, the research in Florida in the area of the relative effectiveness of two clerks as a safety measure is discussed. Also, the research conducted by the government, particularly the National Institute for Occupational Safety and Health (NIOSH), is highlighted, as well as the legislative efforts on the state and federal levels, including Federal OSHA. In addition to research and legislative initiatives, implementation efforts are included. The report also discusses the efforts by academics to evaluate and analyze the results of the studies. The results of research are surprisingly consistent on the effectiveness of certain measures in reducing robbery and violence, including:

- cash control
- escape routes
- lighting
- visibility, and
- training.

There is less agreement on the deterrent value of cameras, however, and more research needs to be done to establish the relative effectiveness of other factors, including:

- two clerks
- bullet-resistant barriers
- guards, and
- closing at night.

Results reported include the fact that since the risk of injury is apparently not reduced with one versus two clerks on duty, then even if robberies are reduced by having two clerks, it is not enough to offset the number who would be injured, by having two clerks on duty. Research that is currently underway, including the UCLA study, funded by NIOSH,

is also described, and the importance of establishing the relationship between crime in the neighborhood with homicide and prior robberies with homicide is discussed.

## **PREFACE**

This report brings together the information on two clerks and other security measures in convenience stores. It is not about the victims of crimes in convenience stores, their families, or the efforts of victim's rights groups, working on their behalf. It is rather about the scientific research on the subject. Such scientific reporting is in no way intended to take away from the terrible suffering that victims, their families, their coworkers, managers and store owners have suffered when a tragic event has occurred. It is not always easy to explore the issue from both sides and to wait for the science. Without question, all parties involved are united in their desire to stem the violence, but the means of reaching that goal are where differences have occurred. This report is about those differences.

This paper was reviewed by several individuals, including Dr. John Howard, M.D., Chief of the Division of Occupational Safety and Health, Department of Industrial Relations, State of California; Dr. Corrie Peek-Asa, Southern California Injury Prevention Research Center at the UCLA School of Public Health, where she is co-director of the NIOSH-funded Workplace Violence Prevention Project; Dr. Harlan Amandus, Senior Research Scientist Batelle Institute in Arlington, Virginia; and Dr. Robert Figlio, Professor of Sociology, University of California, Riverside.

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# INTRODUCTION

*Two clerks . . . two dead people.*  
(A homicide detective, when asked the effect  
of having two clerks on duty, instead of one)

*Two clerks . . . make me feel safer.*  
(Almost any clerk you talk to)

This paper is for the serious student of the two-clerk issue and other convenience store security measures. It is not for someone whose mind is made up on the issues, but for someone who is interested in the etiology of one of the most divisive issues--the two-clerk issue--faced by the convenience store industry, government, and the public in the past two decades. The history of two clerks is really the history of a schism between government and industry; between the public sector and the private sector; and between employers and employees.

The contentious nature of the fight began with Gainesville in the 1980s. Prior to that time, government and industry were actually working together to solve the problem of crime in convenience stores, a collaboration which had begun in the early 1970s, with the Western Behavioral Sciences Institute (WBSI) study, funded by the National Institute of Justice, and characterized by its unique cooperation of government, industry and a non-profit research organization. More will be said about the WBSI study and about the Gainesville study, but the point to be made here is

that up until the time of the Gainesville study, the effort could be characterized as largely cooperative, not conflictual. The two-clerk issue, more than any other security issue, has separated the parties involved. The goals of this paper are to:

- **review the history of the issue;**
- **describe the research done by industry and government;**
- **discuss the legislative initiatives; and**
- **outline future directions.**

At the risk of overstating and oversimplifying the issues, the divisions are basically these:

- ❖ **Employees (along with victim's rights groups), for the most part, believe that industry does not want two clerks because of the cost.**
- ❖ **Industry, for the most part, does not believe in putting on two clerks because they do not know if it actually increases safety.**
- ❖ **Government, as such, is not clearly on one side or the other, but there have been legislative efforts at all levels--city, county, state and federal--to mandate two clerks.**



Curiously, in legislative efforts to require two clerks, the issue sometimes wins and sometimes loses, so it is by no means unanimously viewed as a positive solution to the problem of security in convenience stores when put to the vote. But first some definitions and then, in the next section, the history of the two-clerk issue in the context of convenience store security will be discussed.

The *industry* refers primarily to the convenience store industry, though with the combining of service stations and convenience stores in the 1980s, the distinctions are often blurred. Estimates suggest that convenience stores in this country number around 90,000.

The *two-clerk issue* refers to the idea, often recommended, of having two clerks on duty, rather than one, especially during the late night hours from approximately 11 P.M. to approximately 5 A.M. in convenience stores and service stations.

# RESEARCH AND IMPLEMENTATION

As early as the 1970s, convenience store clerks were recognized as being at risk for violence at work. From 1968 to 1973, robbery in chain stores (not just convenience stores) had increased by 167%, while the robbery rate had gone up 39% in general during the same time period (Crow and Bull, 1975). As a result, the convenience store industry faced a combination of challenges at that time:

**an increase in robbery;**

**a reduction in other targets, since public transportation had moved to a "no-change" rule to reduce their robberies;**

**increased exposure due to having more convenience stores; and**

**increased exposure, due to increasing hours from the original hours of 7 A.M. to 11 P.M. to being open 24-hours a day.**

## **WBSI Research and Southland Implementation**

To study the problem, a grant was sought, and received, by the Western Behavioral Sciences Institute (WBSI) from the Law Enforcement Assistance Administration (LEAA), National Institute of Justice (NIJ), with cooperation from the Southland Corporation, parent company of 7-Elevens.

### **WBSI Research**

The WBSI team included social scientists and ex-armed robbers, and the purpose of the research was to test out new techniques to prevent robbery and violence. With innovative techniques, including behavioral changes, physical changes and employee training, the intervention measures were implemented in 60 experimental stores, which were closely matched, on a stratified random basis, with 60 control stores. In a combined effort with industry and government, the stores selected for study were the 7-Eleven stores.

Southland had been using ex-armed robbers in training seminars for management and employees. This project provided the opportunity to test out deterrence methods through a classic experimental design in a field setting. It was, and remains, the only such large-scale experiment on the subject that has been done to date. The approach included the unexplored strategy of emphasizing prevention by altering conditions at the scene of the crime, so that the robber would not attempt the robbery. Those physical changes, now somewhat common, were new at that time and included the following program components:

**reducing the amount of cash available;**

**posting signs regarding low cash;  
clearing the windows to make the  
register visible;**

**repositioning the cash register up  
front;**

**increasing lighting, inside and out;**

**eliminating escape routes; and**

**training the employees in violence and  
robbery prevention techniques.**

For the study, the rationale behind the procedures was to look at the stores from the robbers' point of view and then devise countermeasures to dissuade them (Crow and Bull, 1975). Some preliminary consideration on the part of the robber is, therefore, assumed. At the scene, the characteristics of the site and the behavior of the store personnel, can lead the robber to reconsider and then either 1) proceed with the robbery; 2) wait until conditions become favorable for the robbery; or 3) give up the robbery and leave the site. The intent of the prevention procedures is to build into the site those characteristics possessed by stores that are seldom robbed and to eliminate features found in stores that are frequently robbed.

Certain procedures (good external lighting and clear windows) provide the store with an external image which can discourage a potential robber. Other features (an alert clerk or a blocked escape route) are designed to further inhibit a robber's plans. Still other features (signs posted in the store and direct verbal and non-verbal

At WBSI, Dr. Erickson coordinated the project data collection and data analysis, and two points are particularly

communication from the clerk) are designed to influence those who actually enter the store with the intention of robbing it. From the robber's perspective, an ideal robbery in a convenience store would include the following considerations:

**Be sure there is money available.**

**Optimize the take/risk ratio.**

**Be persuasive.**

**Avoid disruptions.**

**Get the money quickly.**

**Avoid being seen by anyone but the  
victim.**

**Avoid being recognized.**

**Get away quickly and easily.**

From the point of view of robbery prevention, the countermeasures were devised to address the following:

**Persuade the robber there is little  
money available.**

**Maximize the perceived risks for the  
robber.**

**Maximize the probability of the robbery  
being witnessed.**

**Convince the robber he may be  
recognized.**

**Alter escape routes or provide  
obstacles to a quick and easy exit.**

noteworthy about that time. In all of the project meetings, discussions with the department of Justice representatives or

others did not include the idea of testing two-clerks as a deterrence measure. Secondly, the concept of Crime Prevention Through Environmental Design (CPTED) or Environmental Design (ED) (Jeffery, 1971), was not discussed. The WBSI study design was a separate development, unrelated to ED.

Even though the project would later be called the first test of CPTED, it was in fact coincidental with CPTED.

The WBSI experiment, instituting the robbery and violence prevention measures, resulted in a 30% reduction in robberies in experimental stores, over control stores, during the experimental period. There were significantly fewer robberies in the experimental stores than in the control stores. The results supported the concept that robbers do in fact select their targets, and that physical and behavioral changes at the site can significantly reduce robberies.

### **Southland Implementation**

While the experiment was successful, what remained to be seen was whether the results of the experiment could be applied with equal success on a large scale over time. The Southland Corporation cooperated in a one-year follow-up in Houston, their most difficult geographic area at that time.

After the year of implementation, the Southland Corporation decided to adopt the program company-wide in their stores, numbering over 5,000--a number which would eventually grow to over 7,000 stores. Security managers were added to aid in the implementation and

the monitoring of the program, and computerized systems for tracking loss prevention data were instituted.

After 12 years of implementing the robbery deterrence program in the field, 7-Eleven stores experienced a 65% decrease in robberies nationwide from 1975 to 1986 (Crow, Erickson and Scott, 1987). That decrease has held for twenty years, in spite of the fact that robbery has gone up elsewhere during that time period (Erickson, 1996c). After the WBSI experiment and subsequent Southland implementation, it was concluded that the five most important factors for reducing robberies in convenience stores were the following:

- \_ **Money**
- \_ **Escape Route**
- \_ **Anonymity**
- \_ **Interference**
- \_ **Police Patrols**

### **The Athena Studies**

Ten years after the original WBSI study was completed, the study was updated by conducting interviews with armed robbers to see if the same factors, above, were still the most important to robbers when selecting a site to rob. Because armed robbers were used originally in the 1970s in selecting the components for the program, they were used again as a source of information for

the updated research (Crow, Erickson and Scott, 1987).

With a grant from the Southland Corporation to Athena Research Corporation (Athena), interviews were conducted in five state prisons--Illinois, California, New Jersey, Louisiana and Texas. By this time, Crow and Erickson had left WBSI and formed their own company--Athena. In the 1985 survey, robbers were asked, among other items, to rate eleven factors as to how important each factor was in the decision to rob. The results, listed below, revealed that the factors were ranked in this order, with the amount of money being the most important to the robbers and video recording systems the least important:

1. **Amount of money**
2. **Escape routes**
3. **Anonymity**
4. **Interference**
5. **Active police patrol**
6. **Armed clerk**
7. **Number of clerks**
8. **Number of customers**
9. **Camera system**
10. **Alarm system**
11. **Video recording system**

Because the results showed the top factors to be essentially the same as at the time of the original study, no substantive changes were made to the original intervention program. In other words, the intervening decade had not appreciably changed what robbers looked

for when robbing a store in the 1980s. Dr. Crow's early research in the area was brought to an end with his death in 1989, but the research continued. In an effort to respond to the changes of the decade following the 1985 prison study, the study was repeated again in 1995.

With support from the Southland Corporation, Athena conducted a survey of robbers to determine what they look for when robbing a store. Armed robbers, recently incarcerated, were interviewed, as before, to obtain their most current thinking. This time, the study was conducted in 20 prisons in three states--Washington, Maryland and Texas (Erickson, 1996b; Erickson and Stenseth, 1996).

In this study, 310 armed robbers, from street muggers to bank robbers, told why they do it, how they do it and why people get hurt. Findings are compared with the earlier prison survey. The 1985 prison study had been criticized for not separating out the findings for convenience store robbers, so special attention was given to how convenience store robbers differ from other robbers. Some of the primary differences between convenience store robbers and other robbers are that:

**Convenience store robbers commit a lot more robberies (13 compared to 8, on average).**

**They are more likely to live closer to the site.**

**They are less likely to hurt someone.**

**They are not as easily deterred.**

The top two considerations for all of the robbers in the survey in 1995 when they plan to rob a convenience store were 1) the escape route, and 2) the amount of money. These were the same top two considerations as in 1985, but in reverse order. Three new deterrence items were added to the survey list in 1995. They were *armed* guards, which were ranked third by the robbers; bullet-resistant barriers, which were ranked eighth; and *unarmed* guards which were ranked last.

One-half of the top deterrence measures that they consider important have to do with being armed (armed guard, police or armed clerk), as shown on the list, rank-ordered below. The new items on the list are followed by an asterisk:

1. **Escape routes**
2. **Amount of money**
3. **Armed guard\***
4. **Anonymity**
5. **Police**
6. **Armed clerk**
7. **Interference**
8. **Bullet-resistant barrier\***
9. **Number of clerks**
10. **Alarm**
11. **Number of customers**
12. **Camera**
13. **Video**

**14. Unarmed guards\***

Having two clerks ranked in the bottom half of the list, along with bullet-resistant barriers, cameras, alarms and videos. The number of people in the store is apparently of little concern to the robbers, primarily because of their use of guns. With a gun, 81% of the robbers say that they would take on two or more people. With a partner and a gun, 86% say they would take on two or more people, or an average of 11 people. Findings from other research indicate that guns are used in at least three-fourths of the robbery\homicides in commercial robberies (Erickson, 1991 and 1995a; NIOSH, 1996).

An important difference between the 1985 and the 1995 robbers is that it takes more money now than ten years earlier for a robber to be willing to rob a location. In 1985, 90% would rob for \$150; in 1995, only 40% were willing to rob for that amount. The problem is that the robbers *expect* \$200, on average, from a convenience store, so 45% would be willing to rob anyway, thinking they will get that much.

Robbers rob primarily for the money, but they also rob for other reasons, including the thrill, power, anger, peer-pressure or being high. Their advice to victims included:

- giving up the money**
- keeping hands in sight**
- not resisting**
- not making any sudden moves**

**not talking**

**not staring**

Long-term deterrence measures, such as being identified by cameras, appeared to have little impact on the robbers. Their concern, they said, is with getting caught, trapped or shot *at the time* of the robbery. Eighty-three percent of those surveyed did not think they would be caught. This was in spite of the fact that they were in prison now, and almost half had been in prison before. This means that efforts to lengthen prison time or make the time harder will have little deterrent value because the robbers do not think they will be caught anyway. In fact, only 25% of robbers are caught (FBI, 1996).

Since the amount of money is so important to the robbers, they have to believe that they will *not* get enough money to make it worth their while, and the risk has to be great enough to insure that it is *not* worth their while. Implications of the research are that future efforts need to be on:

**reducing the money;**

**making sure the robber knows that there is less money before he robs;**

**blocking escape routes; and**

**increasing the risk to the robbers of getting caught.**

Table 1 summarizes the results of the WBSI and Athena studies. On the first five measures listed--cash control, escape routes, lighting, visibility and training--a positive relationship was established in all three studies. The

**not trying to be a hero.**

other measures listed either were not examined or did not result in a positive relationship, The exception is armed guards which showed a positive relationship in the 1995 survey of armed robbers.

**Table 1: Security Measures Related To Robbery**

**WBSI & Athena Studies**

<b>Measures</b>	Crow & Bull 1975	Crow et al. 1987	Erickson 1996
cash control	+	+	+
escape routes	+	+	+
lighting	+	+	+
visibility	+	+	+
training	+	+	+
# of clerks			
# of customers			
cameras\video			
alarms			
armed guards			+
unarmed guards			
BRBs			
location			
hours			
prior robberies			

mirrors			
selling gas			

+ = positive relationship

The WBSI and Athena research, as well as Southland's implementation of the measures, have indicated the importance and success of these particular security measures in the stores.

### **NACS Research and Implementation**

While research efforts were continuing by Athena and Southland, the National Association of Convenience Stores (NACS) undertook their own research and implementation as discussed in the following sections.

#### **NACS Research**

Representing convenience stores nationwide, NACS began funding their own research efforts in the late 1980s with three studies, conducted by researchers Schreiber (1991), Figlio (1991), and Erickson (1991). The first was a study to establish the base crime rates and distribution patterns for homicide, sexual assaults, robbery and other crimes of violence in convenience stores (Schreiber, 1991). Study results estimate that approximately 100 workers a year are murdered while working in convenience stores (Schreiber, 1991). The second study analyzed the effects of multiple clerks, bullet-resistant barriers and interactive television on robbery rates in convenience stores (Figlio, 1991).

A third study, which was conducted by Erickson (1991), examined the risk and circumstances of homicide to convenience store employees nationwide. The latter study was based on 79 homicides which occurred in 1989 and 1990. Information was obtained from the stores and companies where the homicides were committed and from interviews with the homicide detectives. The findings included a number of facts which were not previously known about convenience store homicide.

It was found, for example, that there was more than one person present in almost one-third of the homicides, not including the multiple perpetrators, and there was more than one perpetrator in almost half (46%) of the cases. All of the perpetrators were male. The majority of the cases appeared to be gratuitous and senseless in nature with no signs of resistance. A previous study, in Chicago, found that resistance accounted for 82% of commercial robbery killings, and victims who resisted were 49 times more likely to be killed than those who cooperated (Zimring and Zuehl, 1986).

There was evidence of resistance in only 16% of these cases, no doubt because the clerks have been trained to give up the money and not resist. The



majority were found to be stranger-to-stranger, robbery-related homicides. In fact, two-thirds of the homicides were robbery-related, which is fairly consistent with NIOSH statistics. In 1993, 75% of all workplace homicides were robbery-related, compared to 9% in the general population (NIOSH, 1996). Other findings from the homicide study included (Erickson, 1991):

**In almost half of the robbery homicides, less than \$50.00 was taken.**

**Sixty-nine percent of the murders occurred between 11 P.M. and 7 A.M.**

**Handguns were used in 71% of the cases.**

Homicides were classified by motives or causes, based on reports and interviews with homicide detectives, according to the categories found in Table 2 (Erickson, 1995a and 1996a).

**Table 2: Homicide Motives  
N=79**

<b>Motives</b>	<b>Number</b>	<b>Percent</b>
Gratuitous\Robbery	36	46
Gratuitous\Non-Robbery	15	19
Accidental\Resistance\ Robbery	13	16
Acquaintance\Non- Domestic	7	9
Acquaintance\Domestic	5	6
Don't Know	3	4
Total	79	100

Almost two-thirds of the homicides were gratuitous in nature. Only 15% were acquaintance-related.

A follow-up study, supported by NACS, conducted by Erickson with CAP Index, is seeking to determine if a pattern exists with convenience store homicides, based upon the:

- **characteristics of the stores;**
- **characteristics of the neighborhood;**
- **number of previous robberies.**

Previous research has shown that past robberies may predict future robberies, but it is not known whether robberies predict homicide (Crow and Bull, 1975; Erickson, 1991; Schreiber, 1991). That is, if a store has had more than one robbery, they may have additional ones. If they have not had any robberies, they probably will not have. In fact, nearly 80% of stores, in a particular

year, do not have any robberies. In 1990, only 13% of convenience stores experienced one robbery, and only seven percent had two or more that year (Schreiber, 1991). The research question is whether prior robberies lead to murder; that is, whether a location is more likely to have a murder if it has experienced robberies at that location. At this time, data are insufficient on whether robberies predict homicide.

Characteristics of the store include what security measures they have in effect, whether they have the basic robbery deterrence program in place, including: clear windows, lighting, low cash, signage, and employee training. In addition to that, other store characteristics would include whether they have video systems, alarms, guards, bullet-resistant glass or multiple-staffing and whether they close at night.

The characteristics of the neighborhood include crime in the area and measures of social disorganization, such as that used in the CAP Index (Figlio, 1991). This includes the major crimes of homicide, rape, robbery, aggravated assault, burglary, larceny and motor vehicle theft, along with several demographic and other economic characteristics, including physical housing characteristics, and population mobility.

The 1991 Figlio study, supported by NACS, found that two clerks on duty, particularly during the night shift, had a positive effect on the robbery rate in previously robbed stores. There was also some evidence that closed circuit television (CCTV) with a monitor in the front, where potential perpetrators and others can see themselves, may show promise as a robbery deterrent. In a preliminary study, with one year of results, a reduction in robbery was found. Based on 81 stores, the robbery rates decreased from 1.27 robberies per store per year to 0.59 per stores a year later, representing a 54% one year robbery rate reduction (Figlio, 1991). In general, cameras have not, in the past, proven to be a deterrent (Erickson, and Crow, 1980; Crow and Erickson, 1984).

Data concerning bullet-resistant barriers were insufficient, in the Figlio study, because fewer than 1% of the locations had them. A follow-up to that study is currently underway, by Figlio, with continued funding by NACS.

Table 3 summarizes the results of the three studies that have been

undertaken by NACS, all of which found a relationship between prior robberies and subsequent robberies. The positive relationship indicates that the measure may decrease robbery.

**Table 3: Security Measures Related To Robbery**

**NACS Studies**

Measures	Schreiber 1991	Figlio 1991	Erickson 1991
cash control			
escape routes			
lighting			
visibility			
training			
# of clerks		+	
# of customers			
cameras\video		+	
alarms			
armed guards			
unarmed guards			
BRBs			
location			
hours			
prior robberies	*	*	*
mirrors			
selling gas			

+ = positive relationship

\* = relationship

**NACS Implementation**

Twelve years after the NIJ government-funded study by WBSI was published, NACS introduced the robbery and violence prevention program to its members. The program was largely based on the WBSI study results and Southland's experience (Hunter and Jeffery, 1992; Reiss and Roth, 1993). Southland had already made their materials available throughout the preceding decade and shared them with the industry, but the NACS publication made the program and materials available on a wider scale.

While there are no statistics available on the extent of the implementation of the program nationwide, it is generally believed that the large chains of convenience stores and service stations do implement the basic robbery and violence deterrence program and the recommended security measures. However, even ten years after NACS introduced the program and over 20 years after the initial research was first published on the security measures, the implementation is by no means universal.

NACS continues their support of research to understand the problem; they update their training materials regularly; and they make the training materials available to the industry.

## **Florida Research and Implementation**

At the same time that the research and implementation efforts were being undertaken by WBSI, by Athena, by NACS and by Southland, as discussed in

the previous section, a major state-wide effort was underway in Florida. The city of Gainesville, Florida, and the state of Florida, along with researchers in their state universities, were working hand-in-hand on research and legislation efforts for convenience store security as discussed in the next section.

### **Florida Research**

In the *Annual Review of Public Health*, Kraus, Blander and McArthur (1995) evaluated the research, including that done on convenience store security, and that of the Florida researchers. Similarly, in a proposal to NIOSH for studying security measures in the workplace, Kraus (1995), evaluated research efforts on the issue of security measures in convenience stores, including that undertaken in Florida. This research is summarized in the following paragraphs.

#### *Swanson*

In 1986, Swanson reported on interviews with 65 inmates in Florida state prisons and found the most appealing factors to a robbery included these:

- no customers**
- store in a remote area**
- only one clerk on duty**
- no back room**
- female clerks**
- no alarm**
- easy access\get-away**

**obstructed windows**

**lots of cash**

**type of safe**

**many customers**

**heavy traffic in front of store**

**two or more clerks**

**a back room**

**male clerk**

**alarms**

**limited escape routes**

**clear visibility into the store**

**stores that sell gasoline**

**one-way mirrors**

From these factors, Swanson concluded that the primary elements in deterring robbery are:

**work-shifts with more than one clerk on duty**

**limited hours of operation**

**visible security cameras**

**time release safes, and**

**being located near other twenty-four hour stores.**

*Duffala*

Features concerning the location as a determinant of vulnerability to robbery were studied by Duffala (1976).

While none of the factors alone had a significant impact on vulnerability, the interaction of these factors were found to be significant:

The least appealing factors to the robbers in Swanson's survey were:

**being located within two blocks of a major street**

**light traffic**

**few surrounding commercial activities**

**being located in a residential and/or vacant land use area.**

*Jeffery, Hunter & Griswold*

In 1987, Jeffery, Hunter and Griswold examined 34 convenience stores in Tallahassee, Florida, from an environmental perspective and followed them for four and a half years to determine store characteristics related to robbery. They then distinguished ten significant factors for robbery deterrence:

**location of cash register in the center of the store**

**more than one mirror**

**less than two blind corners in the store**

**two or more clerks on duty**

**windows clear of obstructions**

**location off a major street**

**good exterior lighting**

**gas pumps located in front**

**not located near single family dwellings, and**

**heavy vehicular traffic.**

*Hunter*

Hunter, in 1988, developed a list of 14 characteristics that are associated with vulnerability to robbery that complimented the previous list of Jeffery, **concealed access or escape routes**

**security devices**

**cash handling procedures**

**location near other commercial activities open night hours.**

A sample of 110 Florida stores were surveyed and two variables were found to be significant at the statewide level: 1) having a concealed access, and 2) the presence of gas pumps. Good cash handling procedures were negatively related to robbery in the study (Hunter, 1988). Despite what seemed to be a negative finding Hunter later recommended good cash handling procedures, arguing that when used in conjunction with the other prevention techniques, cash handling would have a positive effect (Hunter and Jeffery, 1992).

In 1990, Hunter reassessed 26 of the original stores and found a general decline in robberies of 24%, with some stores showing decreases of as much as 86%, while others had increases in robberies of as much as 50%. Only five of the original ten variables were shown to be significant deterrents, however. They were:

**location of cashier**

**two or more clerks**

**no easy access or escape route**

**evening commercial activity, and**

Hunter and Griswold. Added to this previous list were:

**gas pumps in front.**

*Hunter & Jeffery*

Hunter and Jeffery (1992) in their case study for Clarke's book on *Situational Crime Prevention*, reiterate much of what was presented above, from Kraus and others, but also add to it, in the following ways. Hunter and Jeffery note that the original WBSI study, previously mentioned, has had the most impact upon subsequent attempts to prevent convenience store robbery and was indeed the first application of crime prevention through environmental design-CPTED (Jeffery, 1971) to the crime of robbery. The WBSI findings, they say, have influenced the entire convenience store industry, and many of the prevention procedures found within the NACS program may be traced directly to that work.

In addition, they discuss a study by James White which evaluated 72 convenience stores within Gainesville, and he concluded that the number of clerks working was the strongest predictor of convenience store robbery, and the store environment was not found to be a statistically significant factor.

They point out that Swanson's research also analyzed the relationship between store characteristics and number of robberies, from which he concluded that having two clerks on duty seemed to be the primary element in deterring convenience store robbery in Gainesville, as well as security cameras, time release safes, other 24-hour business and closing stores at midnight. The findings from the 1987 Tallahassee study, Hunter and Jeffery note, were utilized in justifying an ordinance for convenience stores in Gainesville, and later statewide. Hunter and Jeffery conclude from their case study (1992) that among the strategies studied, having two or more clerks on duty has received the most support. The research cited supporting two clerks was all from Florida research, however, and none from outside of the state.

**Table 4: Security Measures Related to Robbery**

**Florida Studies**

Measures	Swanson 1986	Jeffrey et al. 1987	Hunter 1988	Hunter 1990
cash control	+	+	+	+
escape routes	+	+	+	+
lighting		+		
visibility	+	+	+	
training				
# of clerks	+	+		+
# of customers	+			
cameras\video	+			
alarms	+			

armed guards				
unarmed guards				
BRBs				
location	+			
hours	+			
prior robberies				
mirrors	+	+		
selling gas		+		+

+ = positive relationship

Swanson & Jeffery list good cash handling as having support, followed by escape routes, so with these two factors at least--money and escape route--there is agreement with research done both inside and outside of the state of Florida. Table 4 summarizes the results of the Florida research.

**Florida Implementation**

The Gainesville, Florida Police Department analyzed convenience store robbery data and implemented a city ordinance in July, 1986, which included the following components:

- **an unobstructed view of the cash register and sales area through windows**
- **conspicuous signs in the windows indicating less than fifty dollars on hand**
- **signs that a drop-time release safe was present**

- **parking lots lit with approximately two foot candles per square foot**
- **security cameras of a type and number approved by the city manager**

After these efforts failed to produce the desired results of robbery reduction, a provision requiring two clerks on duty was added to the ordinance in April, 1987 (Clifton and Callahan, 1987). By 1989, robberies had declined by 65% (Hunter and Jeffery, 1992). With the exception of cameras, this program comports with the original WBSI study and with the Southland and NACS implementation. It is interesting to note that, even without the cameras, Southland had also experienced a 65% reduction in robberies from 1975 to 1986 (Erickson, 1996c).

Largely as a result of the Gainesville ordinance, the state of Florida adopted the Florida Convenience Store Security Act of 1990 which required that the following security measures for convenience stores be implemented:

- silent alarms**
- security cameras**
- drop-safes and cash management devices**
- a minimum specific lighting standard**
- signs of limited cash availability**
- unobstructed views of cash registers**
- height markers**
- robbery training for employees**
- limited cash from 9 P.M. to 6 A.M.**

- **mandatory robbery prevention training for all employees who work between 8 P.M. and 4 A.M.**

**prohibition of window-tinting.**

As with Gainesville, these measures mirrored the basic robbery and violence prevention measures which had, by now, become accepted industry recommendations, and all of which had been tested in the original research, with the exception of cameras and alarms. Because robbery and assaults did not decrease in the Florida state experience, however, further measures were added to the legislation. The 1992 Act added requirements for businesses open between 11 P.M. and 5 A.M. to have one of the following:

- two or more employees on the premises between 11 P.M. and 5 A.M.**
- bullet-resistant safety enclosures**
- security guard on the premises, or**
- only conduct business through a pass-through window between 11 P.M. and 5 A.M.**

## **Evaluation of Gainesville**

In 1993, The National Academy of Science undertook, under the direction of Reiss and Roth, to determine the effectiveness of the security measures in convenience stores in Gainesville. They found that evaluating the consequences of the two-clerk rule has proven difficult.

The Gainesville Police Department concluded that the rule caused a dramatic



reduction in convenience store robbery, basing its conclusion on the fact that the convenience store robbery rate was substantially lower in the months following the two-clerk rule than it had been during the preceding year. Such a simple before-and-after approach, they say, to measuring an effect is unreliable and, in the Gainesville case, "yielded an erroneous conclusion" (Reiss and Roth, 1993). They go on to cite the work of

The two-clerk rule had gone into effect the following April, with no discernible effect on monthly rates around that time. There were two robberies each month from January through August. Thus, the fact that there were many fewer convenience store robberies in 1987 than 1986 can be more credibly explained by the arrests in December than by the implementation of the two-clerk rule. This conclusion gains support from the fact that the convenience store robbery rate in the surrounding county followed the same temporal patterns as in Gainesville, even though the stores in the county were not subject to the two-clerk requirement.

Thus, Reiss and Roth (1993) contend that the conclusions that the two-clerk rule was effective fails when rival hypotheses for the observed pattern are considered. They continue by saying that although the two clerk rule did not have the large impact that the Gainesville Police Department claimed, there remains a possibility that it had a small deterrent effect, of say 5 or 10% on robberies, which they note is difficult to detect in a city as small as Gainesville. Reiss and Roth (1993) say further that the ultimate conclusion from the Gainesville story is

retired police chief Jerry Wilson (1990), with funding by NACS, in which he demonstrated that there had been a sharp spurt in the convenience store robbery rate during the fall of 1986, and that this spurt ended in December with the arrest of three men suspected of being responsible for a great many of the robberies.

not that there was no effect, but rather that there was no miracle and that the setting and circumstances of the intervention simply do not allow for a more definite conclusion.

The implication of the lack of effectiveness of two clerks, drawn by Reiss and Roth (1993), however, gains support from the experience of the state of Florida. Since the implementation of these measures in Florida, from 1992 through 1995, robberies were down 45%, but homicides were up 50%, according to figures from the Attorney General's office, as shown in Table 5 (Erickson, 1996c).

The Florida research and ensuing legislation predated the Federal government's involvement in research on convenience store security and the issue of two clerks, as will be discussed in the next section.

**Table 5: Robbery and Homicides at Convenience Stores in Florida\***

Offense	1991	1992**	1993	1994	1995	% Change
Robbery	3839	3099	2638	3214	2123	-45%
Homicide	12	15	15	12	18	+50%

\*Information from Florida Attorney General's Office

\*\*Law went into effect in 1992

## Government Research

In the late 1980s, academic public health researchers began to address the issue of risk factors for employee homicide, with the early work of Drs. Kraus and Davis, which identified not only which workers were at risk, but which factors seemed to place them at risk (Davis, 1987; Davis, et al., 1987; Kraus, 1987). These public health researchers had published individual state data on Texas and California, respectively, which identified the problem of workplace homicide and especially the risk for females. Their publications appeared one year after the first Gainesville robbery prevention ordinance had already been implemented.

Later, the National Institute for Occupational Safety and Health (NIOSH), through the examination of state death certificates, identified high risk positions and the factors contributing to that risk (Bell, et al., 1990). These studies and the Center for Disease Control's (CDC) *NIOSH Alert (1993)* have addressed what

That report was followed the next year by a report on the risk of female

makes retail employees, specifically, at high risk, and the results seem to center on the following factors:

- an exchange of money with the public
- working alone or in small numbers
- working late night or early morning hours
- working in high-crime areas

## NIOSH Surveillance and Conferences

The Federal government, it turns out, was far behind industry, social science and local and state involvement with identifying the problem of workplace violence and the issue of two clerks. Not until 1990, fully 15 years after the original WBSI report was published, did NIOSH come out with their first report on the extent of workplace homicide nationwide (Bell et al., 1990).

homicides at work nationwide (Bell, 1991). The same year (1990) that NIOSH

published their first national data on workplace homicide, they held a conference which was reported upon in 1992. For that meeting, NIOSH assembled a group of experts to review the NIOSH data on workplace homicide and make recommendations for the future. The report from that conference called for evaluating the effectiveness of various strategies alone, and in combination with other efforts, including:

**lighting**

**drop-safes**

**visibility**

**increased staffing**

**training.**

To accomplish this, they recommended that demonstration projects and evaluation research be conducted and/or funded to determine the most effective intervention and prevention strategies. The next section discusses the follow-up research undertaken by NIOSH on those recommendations.

The NIOSH data were based on the National Traumatic Occupational Fatalities (NTOF) data base, which was taken from death certificates from the states from 1981 to 1985, revealing the information that homicide, at that time, was the third leading cause of occupational injury death in the U. S., following motor vehicles and machines and accounting for nearly 13% of the nation's total deaths from occupational injuries in the workplace.

In 1993, a new NIOSH report extended the data from 1980-1989. The results were essentially the same as before. The report emphasized that homicide was the leading cause of occupational death from injury for women, and it was still the third leading cause for all workers.

In the 1993 *CDC Alert*, it was pointed out that among workplaces, retail trades had the highest number of occupational homicides, and services had the second highest--the two together accounting for over half (54%) of all homicide in the workplace. Industries with the highest rates of occupational homicide were as follows, in this order, with the rates in parentheses showing deaths per 100,000 workers:

**taxicabs (26.9)**

**liquor stores (8.0)**

**gas stations (5.6)**

**detective\protective services (5.0)**

**justice\public order (3.4)**

**grocery stores (3.2)**

**jewelry stores (3.2)**

**hotels\motels (1.5)**

**eating\drinking places (1.5)**

Taxicab companies, with a rate of 26.9 deaths per 100,000 workers, had almost 40 times the national average of 0.7 and three times the rate of liquor stores (8.0), which had the next highest rate. Taxicab drivers had the highest rate of occupational homicide at 21 times the

national average. High risk occupational rates, from 1980-1989, were as follows, with the rates presented in parenthesis of

- taxicab drivers (15.1)
- law enforcement (9.3)
- hotel clerks (5.1)
- gas station workers (4.5)
- security guards (3.6)
- stock handlers\baggers (3.1)
- store owners\managers (2.8)
- bartenders (2.1)

In addition to pointing out the victimization rates, NIOSH posited the possible risk factors, as noted earlier, and recommended preventive measures. Recommendations made were based on research, which had been conducted both inside and outside of government. The recommended measures, in the 1993 NIOSH *CDC ALERT*, were as follows:

- **Make high-risk areas visible to more people.**
- **Install good external lighting.**
- **Use drop safes to minimize cash on hand.**
- **Carry small amounts of cash.**
- **Post signs stating that limited cash is on hand.**
- **Install silent alarms.**
- **Install surveillance cameras.**

As in 1993, the majority of homicides were of males (80%) but 11%

the number of deaths per 100,000 workers:

- **Increase the number of staff on duty.**
- **Provide training in conflict resolution and nonviolent response.**
- **Avoid resistance during a robbery.**
- **Provide bullet-proof barriers or enclosures.**
- **Have police check on workers routinely.**
- **Close establishments during high-risk hours (late at night and early in the morning).**

A final recommendation was for posting a warning to employees about preventing homicide in the workplace, with a one-page tear-out sheet found in the back of the booklet, showing a gun, a store and a police car with a warning reading as follows: *Workers in certain industries and occupations are at increased risk of homicide.*

In 1996, NIOSH issued *Current Intelligence Bulletin 57*, which expanded upon the data, extending it from 1990 to 1992, for the inclusive dates of 1980-1992. Homicide had moved up from the third to the second leading cause of death, exceeded only by motor vehicle accidents, and 75% of all workplace homicides were found to be robbery-related, compared to 9% of homicides being robbery-related in the general population. The majority of homicides in the workplace were stranger-to-stranger homicides.

of all occupational injury deaths among male workers were due to homicide, while

42% of deaths among female workers were homicides. The majority of those were in the retail trade (46%), largely because men are found in occupations with higher rates of injury and death (Crow and Erickson, 1989), whereas women are more predominantly employed in retail trades and not the occupations with higher rates of injury and death.

In the homicide study of convenience stores (Erickson, 1991), 67% of the homicide victims were male, and 33% were female. This somewhat parallels the research on robbery/murder, in which Cook (1987) reported that 85% of robbery murder victims were male, and 15% were female. Zimring and Zuehl (1986) reported that 80% of robbery murder victims were male, and 20% were female. Since the ratio of male to female workers is not known, it is impossible to determine whether females are more vulnerable than males in convenience stores.

The rankings of industries and occupations, by NIOSH, were also consistent with the Census of Fatal Occupational Injuries (CFOI) data being collected by the Bureau of Labor Statistics. Unlike the NTOF data, which relies on death certificates, provided by the states, the CFOI system uses multiple sources, including death certificates, medical examiner records, workers' compensation reports, and regulatory agency reports. For both reporting agencies, the ranking of high-risk industries and occupations was consistent with taxicab drivers, followed by law enforcement and security personnel and retail trade with the largest

numbers of workplace homicides (NIOSH, 1996; BLS, 1997).

The risk factors, advanced in 1996 by NIOSH were essentially the same as those advanced in 1993, which were listed above, but with the addition of delivery of passengers, goods or services; having a mobile workplace, such as taxicab or police cruiser; working with unstable people, such as health care and criminal justice. The prevention strategies advanced in the 1996 NIOSH report were also essentially the same as those in 1993, although they added escape routes, guards, personal protective devices, and they dropped reference to police patrols and closing at night. These were the 1996 NIOSH recommendations:

**cash control**

**bullet-resistant barriers**

**visibility**

**lighting**

**limiting access and egress**

**security devices, such as cameras, alarms, mirrors, locking devices**

**personal protective equipment**

**increasing the number of staff on duty**

**guards or receptionists to screen entrance**

**training, and**

**administrative controls.**

The final question in the 1996 NIOSH report was "What are the most effective prevention strategies?" In

response, they recommend future research and prevention efforts, noting that 20 workers being murdered each week is unacceptable and should not be

This section has outlined the very important reports issued by NIOSH, based on their surveillance studies and their review of the literature, while the next section discusses the research that they have conducted.

### ***NIOSH Nine-State Study***

One of the studies done internally by NIOSH, known variously as the multiple-city or multiple-state study, was reported by Amandus and others in 1996. As with the other NIOSH studies, this one again identified the nature and extent of the problem but was not itself a study of the effectiveness of the present prevention program in the convenience store (C-store) industry. The paper called for further research to determine that effectiveness.

In a second paper resulting from the study (Amandus et al., 1997), the purpose was to estimate the risk of injury in a robbery situation for various risk factors. Two findings have shown remarkable consistency over twenty years. The original WBSI study found that 5% of the robberies resulted in injury; this study revealed that it is 12%. The original WBSI study indicated that 65% of the robberies were from 9 P.M. to 3 A.M. This study indicates that 59% of the robberies were in that time frame.

For the surveillance, NIOSH selected State Statistical Analysis Centers (SACS). Nine states were

considered the cost of doing business in our society.

chosen for the highest number of C-store robberies. Seven of the nine SACS (Florida, Maryland, Massachusetts, Michigan, Pennsylvania, South Carolina, and Virginia) provided abstracted and coded police report data on a sample of 1,835 convenience store robberies, occurring during 1992 and 1993.

The robberies occurred in and around the following selected metropolitan areas: Miami and Tampa, Florida; Baltimore, Maryland; Boston, Massachusetts; Detroit, Michigan; Pittsburgh and Philadelphia, Pennsylvania; Charleston, Columbia, Greenville, Spartanburg, South Carolina; and Arlington, Chesterfield and Henrico counties in Virginia. Injury data were only used from four states--Florida, Massachusetts, Michigan and Virginia for a sub-set analysis. These permutations account for the variable study names of multiple-city, 9-state, 7-state, 4-state, etc.

The finding was that the employee risk of injury was not significantly different between one-employee (0.106) and multiple-employee (0.111) stores. Similarly, the employee risk of severe injury was not significantly different between one-employee (0.029) and multiple-employee stores (0.022). Thus, the results of their study, overall, indicate that there is no evidence of increased safety with two clerks over one clerk. In other words, the evidence is insufficient to base a recommendation for two clerks on the results.

Because the risk of injury is not different with one versus two clerks, then when there are two clerks in the store, and there is an injury-producing event, the risk of injury is doubled because the potential number of people who might get hurt has been increased. Even if robberies are reduced by having two clerks, they would have to be reduced by more than twice the amount to make up for the number who would be injured because of the increased exposure.

Florida's statistics are consistent with this finding, with robberies being reduced by 45% in convenience stores, but homicides increasing by 50% in the same time period from 1991 to 1995 (Erickson, 1996c). In sum, more people may get hurt with two clerks on duty because it does not decrease their chances of getting hurt to have two on duty, and it increases exposure; that is, the number out there to be hurt. In fact, the NIOSH statistics show that when the unit analysis of *each robbery* is used, rather than *each clerk*, the chances are in fact double; that is .106 for one clerk and .206 for multiple clerks.

The article concluded the following (Amandus et al., 1997:447):

The literature thus remains unclear on which ED [environmental design] measures are most effective and specifically whether the presence of two or more employees at night will deter robbery in C-stores. There is no information on the effect of two or more employees on overall injury rates. The study presented here found that the employee risk of injury and severe injury in a

robbed store was essentially the same in single- and multiple-employee stores. If there were similar injury rates given a robbery among single- and multiple-employee stores, there would obviously be an increase in the number of injuries in multiple-employee robbed stores, compared with single-employee robbed stores because there would be additional employees at risk in the former; this was confirmed in our data.

### **NIOSH Virginia Study**

After the NIOSH epidemiologic researchers identified industries with a high risk of work-related homicide, NIOSH undertook a collaborative project with the Virginia Department of Criminal Justice Services and local police departments to evaluate the deterrent effect of crime prevention strategies in Virginia convenience stores, developed in 1993. The original project officers--Dr. Harlan Amandus, Chief, Analysis and Field Evaluations Branch, NIOSH, and Dr. Jay Malcan, Crime Prevention Specialist, Virginia Crime Prevention Center, Virginia Department of Criminal Justice Services, state of Virginia--have since left their positions and respective agencies.

Designed as a case-control study of robbery-related injuries, NIOSH has been studying the violent crimes which occur in selected cities within Virginia, but the study has been extended in time because not enough robberies occurred in the one-year time period originally planned. Results are now being

analyzed and are expected to be published within a year. One of the measures specifically addressed will be the two-clerk issue and whether or not two clerks prevent either robbery or injury.

This section completes the review of the research that has been conducted on the issue of two clerks up to this time. In a later section, the other research currently underway will be summarized, but first an examination of the legislative initiatives being undertaken in states other than Florida is presented, which relates primarily to two clerks.



## LEGISLATIVE AND GOVERNMENT INITIATIVES

Having dealt with the research conducted by social scientists, the industry and the government, let us turn now to the legislative initiatives on the subject of two clerks and other security measures for convenience stores. Already discussed were the Gainesville legislation (1987) and the Florida legislation (1990 & 1992), since those legislative initiatives grew directly out of the research in Florida.

### **Cities**

An earlier effort to legislate two clerks than Gainesville, however, occurred in Akron, Ohio in 1980. Akron was the first city to try to legislate two clerks, an attempt which was not successful at that time. In 1990, the city of Memphis, Tennessee, similarly considered legislating two clerks but ended up recommending the basic robbery deterrence program instead.

### **States**

In the 1980s, activity was also going on at the state level. After a year of study and testimony on the issue of robbery and violence in convenience

Probably the most sophisticated approach on the state level was the effort by California OSHA. The effort was not, however, a form of legislation, but rather a model program recommended to

stores and gas stations, the Maryland Governor's Task Force on Retail Security recommended the basic robbery prevention program, instead of two clerks, when they concluded the following (Crow and Erickson, 1989):

Proposals, such as limiting store hours, two employees on duty at certain hours, store cameras, and electronic alarms, have been advanced to control robbery of retail businesses; but there is no empirical evidence or data to show that such techniques will reduce retail robberies or minimize the violence to employees. (Maryland, 1988:19).

Similarly, in the state of Washington, the two-clerk legislative effort failed, and the basic robbery prevention program was legislated, along with a video for employee training, which the state produced. In the 1990s, the State of Virginia entertained two-clerk legislation for several years but they have now made other recommendations instead. This brings us to the state of California, which implemented a model program in 1995 discussed in detail below.

### **Cal-OSHA Model Program**

employers. Cal\OSHA was particularly concerned about workplace homicide when, in 1993, homicide became the leading cause of workplace death in California, joining Alabama, Connecticut,

Maryland, Michigan, South Carolina and the District of Columbia (Howard, 1996). The most prevalent category of workplace homicide was retail store robberies.

The typology that Cal\OSHA developed guides much of the thinking on the subject nationwide today. Outlined in 1995 in the *Cal\OSHA Model Injury and Illness Prevention Program for Workplace Security*, the typology characterizes three types of workplace violence (California, 1995).

For purposes of understanding which category or type workers fall into, it is important to remember that workplace violence is of both an internal and external nature. This distinction is often overlooked by those studying or working to prevent violence in the workplace or the media's reporting of workplace violence. The three types, as developed by Cal-OSHA, are presented below, with examples (California, 1995).

**Type I.** External--Assault or threat by outside third parties, usually criminals. No legitimate relationship with the affected workplace, which is commonly a retail establishment.

Examples: robbers, rapists, murderers.

**Type II.** Service-related--Assault or threat by someone who is the recipient of a service provided by the affected workplace, such as health care providers and the public sector, i.e., police, parole, welfare.

Examples: patients, clientele, customers.

**Type III.** Internal--Assault or threat by an individual who has an employment-related involvement with the affected workplace.

Examples: disgruntled employees, troubled employees, management problems, co-worker problems, acquaintance problems, domestic problems.

The incidents involving Type I are the most common type of workplace violence overall, and the most common type of violence for retail workers, with estimates as high as three-fourths of the homicides occurring in this category. Type I is characterized by the outside actions of third parties, usually criminals, coming on the premises to commit a crime. Retail workers, however, are also at risk of Type II violence, such as attacks by customers.

While relatively uncommon, such instances do occur with angry or drunk customers. Even though clerks are often trained to defuse the incident, such efforts are not always successful, and not all clerks are trained or willing to back down to what they may consider to be unreasonable requests, comments or behavior. Type III violence, based on anecdotal information, appears to be less of a problem within the convenience store industry than it is in other industries, for a number of possible reasons. Typically it is the "loner" who is profiled as a potential troublemaker in internal workplace violence incidents.

First, the turnover rate in convenience stores is high, as compared to manufacturing, for example, so there is not as much time for uneasy alliances to form; for high competition among co-workers to develop; for supervisor-subordinate problems to evolve; or for people to be passed over for promotion or laid off, when their expectation was for

long-term employment. All of these factors are more common in large

Also, the convenience store employee tends to work somewhat independently. Unlike fast food workers, who work in close quarters with each other, convenience store workers are relatively autonomous. In sum, while retail workers are at greater risk for homicide from the Type I category, they are at less risk from Type II, as compared to public servants or hospital workers, for example.

Government workers make up 18% of the workforce, but 30% of the victims of violence are government employees, who are likely to experience more Type II violence (U. S. Justice, 1993). Retail workers are also at relatively low risk for Type III violence. Fewer than 15% of convenience store workers who were killed on the job were killed by someone who was known by them, according to the study of homicides in convenience stores (Erickson, 1991).

The recommendations provided by Cal/OSHA for preventing Type I violence include these physical changes (Howard, 1996):

- 1) **visibility**
- 2) **lighting**
- 3) **mirrors**
- 4) **cameras**
- 5) **cash handling and signs.**

Other recommendations include work practice changes of (Howard, 1996):

hierarchically-based companies than in convenience stores (Erickson, 1996a).

- 1) **keeping an eye outside**
- 2) **staying away from register when not busy**
- 3) **limiting cash**
- 4) **having a time-access safe**
- 5) **using only one register after dark**
- 6) **leaving unused registers open and empty**
- 7) **training employees in not resisting.**

The Cal\OSHA model program does not go beyond the measures which have been tested, with the exception of cameras, which by 1995, had become fairly standard in much of the industry anyway. The Cal\OSHA model program. does not make recommendations for the use of bullet-resistant barriers, multiple staffing or closing at night.

Dr. John Howard, Chief of the Division of Occupational Safety and Health, Department of Industrial Relations, State of California, says that although many of the causes of workplace violence have their origin in forces *outside* of the workplace, and there are gaps in the knowledge about how to prevent the occurrence of some types of workplace assaults, there is enough known to develop effective prevention programs in the workplace (Howard, 1996). He goes on to say that the problem cannot be solved by government alone.

## **Federal-OSHA Draft Guidelines**

A year after the Cal\OSHA model program was developed, Federal OSHA issued the draft of *Guidelines for Workplace Violence Prevention Programs for Night Retail Establishments* (Biles, 1996). Patricia D. Biles, Workplace Violence Program Coordinator at OSHA, took the lead in preparing the document and fielding the responses to it. The Federal Guidelines, as with Cal\OSHA, were never framed as, or intended to be, regulations.

As stated in the notice accompanying the guidelines, they are not a new standard or regulation and are advisory in nature. OSHA, it was noted, would rely on Section 5(a) of the Occupational Safety and Health Act of 1970 (OSH Act) "General Duty Clause" for enforcement authority. Further, employers could be cited for violating the General Duty Cause if there is a recognized hazard of workplace violence in their establishments, and if they have done nothing to prevent or abate it. The guidelines stated that OSHA would not cite employers who have effectively implemented these guidelines. OSHA had previously issued guidelines for health care workers.

As a first step after the issuance of the draft guidelines, comments were invited from stakeholders with an original deadline of June 30, 1996, which was extended to September 30, 1996. They received an overwhelming response from industry recommending changes. As a result, a stakeholder's meeting was held on November 4, 1996. Approximately ten people were invited from the industry to make presentations, and OSHA invited

about the same number. This was a somewhat different arena for OSHA to be operating in for a number of reasons (Erickson, 1996c).

The reasons included the fact that these workplace safety issues have nothing to do with asbestos, scaffolding or accidents. They have rather to do with the *intentional actions of criminal third parties* coming into the business to do harm. This is new ground for OSHA, and this is the first time that OSHA has advanced prevention measures in this area. This is also the first time that OSHA has been involved in trying to prevent such unpredictable behavior--behavior which others, in many disciplines, have been studying for over twenty years.

The issues before OSHA, it seemed, were those of both process and content, and dealt with both legal and research issues. The process deals with *how* these guidelines are issued, and the content involves *what* is in them. Within the process and the content, there are both legal and research issues, and within the legal and research issues, there are both process and content issues. Some of the legal issues, related to both the process and content, are questions of:

### ***Legal Issues***

- **Liability**
- **Definitions**
- **Guidelines vs. Standards**
- **Enforcement**
- **Compliance**
- **Burdensome Requirements**

For example, some of the questions are these:

- Does the very presence of guidelines or standards create potential liability for business owners?
- Are they in fact guidelines or are they standards?
- How can they be enforced?
- How do such variant businesses comply?
- Is the recordkeeping, analysis, monitoring crime trends, and the training and retraining of employees too burdensome?

Some of the research issues, related to both process and content, are these:

### ***Research Issues***

- Internal vs. External Violence
- Larger Social Context
- Validated vs. Non-Validated Research

### ***Internal vs. External Violence***

Examples here are understanding and distinguishing between internal and external violence--two very different types of violence; one, as mentioned earlier, being the external violence perpetrated by outside criminals, and the other being the actions of employees within. The larger social context in which the violent events occur cannot be ignored either.

### ***Larger Social Context***

– What are the definitions of night or late night?

– What type of businesses do they include?

The problems of crime in retail settings cannot be solved until the larger social issues are addressed. The larger issues in society lead criminals to commit the crimes and become repeat offenders. Root causes of crime include these, among others, (Currie, 1985; Erickson and Crow, 1980; Wilson and Herrnstein, 1985):

- unemployment**
- lack of job training**
- poverty**
- breakdown of the family**
- child and spousal abuse**
- racial inequalities**
- inadequate education**
- drug abuse**
- youth gangs**
- urban decay**
- neighborhood decay.**

The FBI suggests that the causal factors related to the changes in the pattern of homicide are related to the illicit drug trade, the disintegration of the family unit and weapon proliferation (FBI, 1993).

Certain problems which affect violence occur within the criminal justice

system (Currie, 1985; Erickson and Crow, 1980; Erickson, 1995b; Wilson and Herrnstein, 1985). Examples of these follow:

**Crimes are committed with guns, but there are few restrictions on them.**

**Criminals recidivate and commit more crimes, but they are released from prison early anyway, because of prison overcrowding.**

**Uneven and uncertain sentencing is meted out by overwhelmed courts.**

A study in Virginia, for example, determined that almost half (42%) of the convenience store robbers were "legally restrained"--that is, they were in the criminal justice system at the time of their arrest (Virginia, 1993). Eighty-two percent of state prisoners have prior convictions, and nearly two-thirds of inmates have current or prior convictions for violent offenses (U. S. Justice, 1985). It is difficult to run a retail business in a climate of societal violence, and in a society which is experiencing problems within the criminal justice system as well. In the meantime, efforts, such as those outlined earlier, need to be continued in an attempt to harden the targets and make the workplace safer for retail employees.

The nature of retail crime has been changing in a number of ways too: Convenience store robbers seem willing to rob for less; they may steal

**Police are out-numbered and out-gunned on the streets.**

merchandise, especially cigarettes, rather than money; they are more likely now than before to openly steal, without force or threat of force; carjackings at gas islands are a reality, making some people afraid to go there at night.

Assaulting and robbing customers in the parking lots of stores is occurring, perhaps even increasing; gangs and graffiti are a fact of life in many cities, and loitering and panhandling are major problems for stores located in center cities. Murders by strangers and unknown persons represented 53% of the murders in the nation during 1992, representing a historical high (FBI, 1993).

According to the FBI, every American now has a realistic chance of being murdered by a stranger, rather than someone they know, because of the random nature that homicide has assumed in the recent past. This leads to a more generalized fear of violence. Criminals are also younger and more violent. The average age of murder arrestees has fallen significantly. It was 32.5 years in 1965, and was 27.0 in 1992. The fastest growing murder circumstance is juvenile gang killings, and the victim may not necessarily be associated with a

gang. Such changes impact upon retail settings.

### ***Validated vs. Unvalidated Research***

The third research issue, presented at the OSHA stakeholders meeting, has to do with promulgating non-validated versus validated research.

- **Keeping low amounts of cash in the register**
- **Ensuring good visibility**
- **Maintaining good lighting**
- **Using security cameras and video systems**
- **Limiting access and escape routes**
- **Training employees in proper behavior.**

The non-validated measures are these (Erickson, 1996c):

- **employing multiple clerks at night**
- **using bulletproof shielding**
- **employing guards or off-duty police officers at night.**

The primary concern expressed at the November, 1996 meeting about the preventive strategies was the recommendation for two clerks, which continues to be the major point of contention between the industry and OSHA. At this writing, a revised set of guidelines has not yet been issued.

### **Other Federal Initiatives**

Erickson's paper centered on covering the research issues, while others at that meeting, and in written responses to OSHA, have dealt with the other issues of compliance etc. The validated measures are those of the basic robbery and violence program, recommended by the industry and others which are as follows (Erickson, 1996c):

In the following paragraphs, some examples of other federal involvement with the problem of convenience store crime and security are outlined.

### ***FBI***

The FBI has been keeping track of robberies for both convenience stores and service stations for over a decade, which has been a two-edged sword for the industry. While it has enabled the industry to have the information on the extent of its robbery problem and the effects of ameliorative measures, it has also focused attention on this industry alone, and not others. There is, for example, no FBI robbery data on hotels\motels, bars, liquor stores or restaurants. There is no breakdown on homicide for any categories of business, including convenience stores--information which would be extremely useful.

Because of the recordkeeping, however, we do know that, according to the latest FBI statistics (FBI, 1996), convenience store robberies decreased by 33% from 1991 to 1995, and service station robberies decreased by 25%. The FBI statistics also bring perspective to the percentage of robberies that take place in convenience stores. They account for

5.2% of all robberies, compared to streets and highways, which account for over 50% and residences at 10.8%. With the attention paid to convenience store crime, it is often believed that they are a far greater percentage of the robbery

In an effort to aid small business, particularly convenience stores, the U. S. House Committee on Small Business held a hearing on Crime and Small Business on July 21, 1994, chaired by Representative John J. LaFalce. Four witnesses testified at the hearing on "Strategies in the War Against Small Business Crime" (1994): Dr. Linda Rosenstock, Director of NIOSH; Jere Glover, Chief Counsel for Advocacy for the U. S. Small Business Administration; Teri Richman, Senior Vice President, NACS; and Rosemary J. Erickson, President, Athena Research Corporation.

Chairman LaFalce opened the hearing by commenting that small businesses are the heart and soul of many urban neighborhoods and that when they leave, city residents are not far behind. He pled for broader policy initiatives in the area and the need to find ways to build on the research that is available.

Dr. Rosenstock spoke about the available research, testifying that there is general consensus on measures which reduce crime in convenience stores, which include visibility, lighting, and cash control but that there is considerable debate about the effectiveness of certain other measures, such as multiple clerks at night, surveillance cameras and bullet-proof enclosures because of study design limitations and conflicting results across

problem in this country than these figures indicate.

## **Congress**

studies. Thus, she testified, the effectiveness of these security measures in actually preventing violence against employees has not been assessed.

Erickson testified that government is often quick to suggest solutions, and business is equally quick to reject them because of their fears of government intervention and increasing their cost of doing business. Further, in a plea for continued research, by both government and industry, it was noted people should not go by common sense beliefs in an area of study where lives are involved. Just as government would not recommend a vaccine without testing it; neither should they recommend crime prevention solutions without testing them.

Follow-up recommendations from the Committee included requests to the House-Senate conference on Commerce, Justice, State and Judiciary appropriations for fiscal year 1995, asking for three things:

- 1) **Provide funds for the Department of Justice, Bureau of Justice Statistics, and the Census Department to conduct a National Business Crime Victimization Survey.**
- 2) **Instruct the FBI to begin collecting more specific data on business-related crime and violence, by specifically breaking out homicide and other violent crimes by type of business.**
- 3) **Provide funds allowing the National Institute of Justice to commission a study on**



**the effectiveness of specific robbery-deterrence measures.**

Although the request was not granted, interest was generated, and the requests were sent directly to NIJ, FBI and Justice (LaFalce, 1994).

Point number three above--to provide funds to NIJ--seemed a logical extension of NIJ's early involvement with funding the WBSI study in the early 1970s to test the effectiveness of specific robbery-deterrence measures. No large-scale experiments to test new measures for combatting crime in small businesses have been funded by them, or any other agency for that matter, for over 20 years.

# THE STATE OF THE KNOWLEDGE

Before discussing the state of the knowledge, it is important to discuss three issues related to understanding the research on the subject of robbery and violence in convenience stores, which will be explained in the following paragraph.

The three issues are:

- 1) robbery vs. homicide;
- 2) injury to customers vs. employees; and
- 3) exposure data.

## Robbery vs. Homicide

The question is whether we are trying to prevent robbery or prevent violence with these deterrence efforts. Overall, it has been assumed either that 1) they are one and the same, or 2) if you prevent robbery you prevent homicide. Based on Cook's (1987) research, he found that if you reduce robbery, you reduce homicide, but the two-clerk issue may be an exception to that premise because it may be a security measure that, if introduced, may actually *increase* homicide.

The NIOSH research revealed (though it was suspected before) that if two clerks were added, reducing robberies may not reduce homicides because you double the risk, i.e., exposure. Using that paradigm, let us examine each of the proposed security

measures and see whether the measure does one of the following:

- 1) **increases or decreases robbery;**
- 2) **increases or decreases homicide;**
- 3) **decreases robbery, but increases homicide; or**
- 4) **increases robbery, but decreases homicide.**

Based on a preponderance of the evidence of the research findings, discussed within this paper, and assuming proper training and implementation for each of the measures, the results appear to be as follows:

**lighting** (decreases robbery and decreases homicide)

**visibility** (decreases robbery and decreases homicide)

**reducing cash** (decreases robbery and decreases homicide)

**training employees** (decreases robbery and decreases homicide)

**escape routes** (decrease robbery and decrease homicide)

**cameras** (may not decrease robberies; may not decrease homicides)

**alarms** (do not decrease robberies; do not decrease homicides)

***closing establishments at late night hours*** (increases robberies at opening and closing and may increase homicides at those times, but not necessarily the total number of robberies or homicides)

***guards*** (may decrease robberies, but may increase homicides if, as with banks, there is more violence with guards)

***two clerks*** (may decrease robbery, but may increase homicide because two people are exposed, rather than one)

***bullet-resistant barriers*** (may reduce robberies *and* injuries for the clerks, but may increase robberies and homicides among customers).

By using the robbery versus homicide paradigm for the various security measures above, it is clear why the basic robbery violence program is in effect, with lighting, visibility, cash control, escape routes and training because those measures decrease both robberies and homicides. Guards and two clerks are the only measures which may increase homicides, even though both may decrease robberies. In future research, it needs to be clear which outcome is being measured--robbery or homicide.

## **Customers vs. Clerks**

A second problem, in addition to whether we are measuring robbery or homicide, is whether the outcome measure is injury to clerks or customers. Again, the result of a particular measure may be effective in protecting one, but not the other. The best example of that is bullet-resistant barriers, which on the face of it, may seem the ideal solution to both the robbery and homicide problem.

In fact, there are situations, and resulting civil litigation, in which the clerk has been behind a bullet-resistant barrier, and the customer has been robbed and/or shot, or the customer has been held hostage, while the clerk is ordered to give up the money. One robber in the prison study said "They have to come out sometime, so I just wait for them" (Erickson, 1996b).

This disparity between reducing robberies or reducing injuries may be responsible for part of the schism between government and industry. The other part may be due to whether injury is to employees or customers. If this is the case, it may not be that industry and government are at odds, but that they have been working unknowingly toward these different ends: 1) robbery versus homicide and 2) employees versus customers. Both OSHA and NIOSH's missions are employee safety and employee injury--not customers and not robbery, but the business owner has to consider both employee and customer safety and robbery and injury.

## **Exposure Data**

No research, to date, on crime in convenience stores has had the luxury of having exposure data. Without it, we will never really know the answer to the question of whether two clerks are safer than one. For exposure data, stores with two clerks need to be matched with stores with one clerk to determine which are more likely to have robberies and which are more likely to have homicides. Without exposure data, it is meaningless, for comparison purposes, to state that the

majority of robberies or homicides are with one clerk, rather than with two.

While it is not wrong to say that more homicides occur with one clerk than two, it is misleading because the assumption is that a clerk was robbed or killed *because* there was only one clerk on duty, when in fact the number may just represent the reality of what was out there. Since it has been estimated that 85% of the stores may have just one clerk on duty on the late-night shift, that exposure factor alone may be the reason for the majority of homicides occurring when only one clerk is on duty.

When NIOSH concludes that the most dangerous time for homicide at work is at night, working alone, dealing with the public, with the exchange of money, it might be that homicides or robberies with one clerk on duty are a result of correlation and not causation. Future research needs to address exposure data to adequately answer the research question of one versus two clerks as a safety factor.

## Overview

Amandus (1993:3), in a proposal to study two clerks in Virginia, said the following about the studies which had been done to test the effects of crime deterrence measures:

There is good consistency among study results for the crime-deterrent effect of some design features and prevention strategies. However, study shortcomings, including possible confounding, lack of specificity in the measurement of individual design features, small sample

size, lack of standardization in the definition of environmental designs and inability to extrapolate to store populations in a wide geographic area, suggested the need for further research.

Amandus went on to say that lighting, visibility, traffic, escape routes and training appear to effectively deter robbery, but results were inconsistent with respect to multiple clerks, security systems (cameras, videos, alarms) and cash-handling procedures. In addition, he noted the need for further research on the relationship of previous robbery and neighborhood characteristics.

Another issue in need of study for their effectiveness as a security measure in convenience stores are guards. According to Baumer and Carrington (1986), guards have not proven to be a deterrent in banks, and banks had reduced the number of guards at that time to approximately 8% because they found that there was more violence if an event occurred and a guard was on duty (Baumer and Carrington, 1986; Crow and Erickson, 1989).

Recently, however, with the increasing use of guards and private security in general, retail settings appear to be increasingly using guards, either roving or stationary. Roving guards cover a number of locations, rather than remaining at a stationary post. The use of personal alarms also seems to be increasing, which allows the person to carry an alarm with them. Though alarms are not considered a deterrent for a robbery, they may have utility as an

assault or rape deterrent, though that effect remains untested as well.

Other measures which need to be tested in an experimental setting are the effects of one clerk versus two clerks, as Amandus noted above. Also, testing is needed on the effects of closing at night because there is some evidence of displacement in time where closing has been tried; that is, that robbers are more likely to rob at opening and at closing if the retail setting is closed at night. Fast food outlets are an example. Robbers may just rob at different times: "Just as bank robbers keep banking hours, so convenience store robbers keep convenience store hours" (Crow and Erickson, 1989). That is, their vulnerability to crime is a function of the time at which they are open for business.

Table 6 summarizes the findings on the security measures which have been studied and their relationship to robbery. While location is listed as a separate item on the table as a security measure, it actually measures a number of different variables, such as type of neighborhood, commercial activity nearby, isolation, and so on. Hunter and Jeffery (1992) had concluded that two clerks have received the most support, followed by cash control and escape routes, which does not seem to follow from their analysis. The results show rather that cash and escape routes have received the most support, in the studies, followed by visibility and lighting, and then by two clerks and training, as follows:

1. Cash
2. Escape routes

### 3. Visibility

### 4. Lighting

### 5. Two clerks

### 6. Training

The original WBSI study and the Southland and NACS research and implementation, as well as Cal\OSHA, include the first four measures in their programs, along with training. Those elements are considered by the industry, through both research and experience, to be the most important variables known at this time to reduce crime in convenience stores.

In fact, all legislation, including Florida, Gainesville, and Federal OSHA includes these elements, but add to it certain other measures. For example, Florida and Cal\OSHA recommend cameras and alarms, even though they have not been validated through research, and cameras have been negatively associated in some research as reviewed in the literature by Erickson and Crow (1980) and in an experiment by Crow and Erickson (1984).

Though the industry's experience is mixed on the use of cameras, they have essentially become a standard because of their widespread use and their increasing role in apprehension. As mentioned earlier, they at least do not seem to increase robbery or homicide. The same may not be said for two clerks, however, as found in the recent prison study of armed robbers, in which robbers who injure were compared to those who

do not, which is discussed in the following section (Erickson, 1997).

**Table 6: Security Measures Related to Robbery: Overview**

Measures	Studies									
	Crow & Bull 1975	Crow et al., 1987	Erickson 1996	Schreiber 1991	Figlio 1991	Erickson 1991	Swanson 1986	Jeffery et al., 1987	Hunter 1988	Hunter 1990
cash control	+	+	+				+	+	+	+
escape routes	+	+	+				+	+	+	+
lighting	+	+	+					+		
visibility	+	+	+				+	+	+	
training	+	+	+							
# of clerks					+		+	+		+
# of customers							+			
cameras\video					+		+			
alarms							+			
armed guards			+							
unarmed guards										
BRBs										
location							+			
hours							+			
prior robberies				*	*	*				
mirrors							+	+		
selling gas								+		+

+ = positive relationship  
 \* = relationship

**Robbers Who Injure**

Additional analysis has revealed new information about how violent robbers differ from non-violent robbers, which can now be taken into consideration when planning programs to deter robberies and prevent injury. Money

was significantly more important to the violent robbers than to the non-violent robbers, so reducing the money not only turns away robbers in general, which we have already known, but turns away the more *violent* robber.

A second finding is that the violent robbers were much less likely to be deterred by *any* measure than were the non-violent robbers. In particular, they were not deterred by people, whether guards, customers or clerks, and were more willing to take risks. The violent robbers were willing to take on an average of 14 people with a gun and a partner, compared to 11 people for the non-violent robbers. This agrees with the NIOSH finding that there is more injury with two clerks because it may even be the more violent robber that takes on two clerks--a robber who is more willing to injure or kill. So then the issue becomes not a question of one or two clerks, but one or fourteen clerks.

A good summary of which measures work comes from Amandus and others (1996:717) at NIOSH, in which they said the following regarding the validated robbery and violence prevention program:

Minimum elements of C-store robbery prevention programs and some state and local government regulations, include: keeping low amounts of cash in the register; ensuring good visibility within, into, and out of the store; maintaining good lighting within and outside of the store; using security cameras and video systems; limiting access and escape routes to and from the store and the surrounding property; and training employees in proper behavior, such as passive response, in a robbery situation. Although evidence is somewhat equivocal for the effectiveness of these minimum prevention elements, they are accepted industry standards.

With the exception of cameras above, the other measures have proven effective in the original field experiment, funded by NIJ, and in 20 years of experience in 7-Elevens, resulting in a 65% reduction in robbery. Regarding the other additional and non-validated robbery and violence prevention measures, the Amandus article went on to say this (1996:717-718):

More controversial robbery prevention measures that have been recommended by some local and state governments and adopted by a small part of the C-store industry, include: employing multiple clerks at night, using bulletproof shielding around the cash-register station, and employing guards or off-duty police officers at night. Although these more controversial prevention measures have intuitive appeal, they are not widely used and their effectiveness has not been confirmed.

Closing at night also has not been tested. The conclusion of the Amandus article was as follows (1996:718):

There is a need to evaluate these specific environmental design interventions further to determine whether they effectively reduce robbery risk and to estimate their cost benefit. Because the ED [environmental design] approach also may be useful in other retail settings, there is a need to evaluate the applicability of these interventions in other retail industries.

Evaluating these measures and expanding the test of them to other settings is precisely the point at which the

current research is, as discussed in the following section.



## RESEARCH UNDERWAY

There are at least five major studies underway by both government and industry to study the effectiveness of convenience store security measures.

### **NIOSH 15-City Study**

### **NIOSH Virginia Study**

### **NACS Homicide Study**

### **NACS Camera and Two-Clerk Study**

### **NIOSH-Funded UCLA Study**

All but the NIOSH-funded UCLA Study were discussed previously under research and implementation, as they have been ongoing for sometime. The newest and largest in scope is the UCLA study, described in the following paragraphs.

### **UCLA Study**

This four-year Workplace Violence Prevention Project (WVPP), funded by the National Institute for Occupational Safety and Health (NIOSH), is a collaborative effort with the California Occupational Safety and Health Administration (Cal/OSHA), the Southern California Injury Prevention Research Center (SCIPRC) at UCLA, and Athena Research Corporation. Drs. Kraus and

Peek-Asa at SCIPRC and Dr. Howard at Cal/OSHA all have had extensive experience in work-related violence research. Researchers from the SCIPRC designed the overall study and are responsible for implementing the intervention program and also for the comprehensive evaluation of the intervention.

Because workplace violence is responsible for over 20% of work-related deaths nationwide, and because certain occupations and employees are consistently found to be at elevated risk of workplace homicide, these high-risk businesses were selected for study. Among the high risk occupations, factors such as hours of operation, cash handling, and store visibility have been identified as increasing an individual business's risk of workplace assault.

Businesses in Southern California were randomly allocated into intervention and comparison groups. The businesses included service stations, convenience stores, bars and restaurants, liquor stores, grocery stores, hotels and motels, and taxicab drivers. The WVPP has two objectives:

**1) to provide an intervention to reduce violence in up to 1,000 Los Angeles City businesses at high risk of crime-related workplace violence.**

**2) to evaluate which measures or combinations of measures are most effective in**

**reducing workplace violence in different business settings.**

The intervention includes employee training, cash control measures, lighting, visibility, escape routes, entry\exit control, floor design, and the use of security equipment, such as alarms, cameras and timed safes. Each participating business receives:

- **a personalized action plan detailing recommended steps for the individual business**
- **a workplace safety manual which describes the program and types of security equipment**
- **a video for employee training**
- **a safety poster**
- **brochures for employee training**
- **safety decals for the front entrance, the cash register, and the safe.**

The evaluation will determine the effectiveness of the program overall as well as the individual components of the program. The differential effects among different types of business settings, such as type, size and location, will also be examined. The overall goal is to identify which businesses can benefit most from different combinations of prevention strategies, with consideration of the resources available to the business.

The UCLA study, along with the two NIOSH studies and NACS studies, should combine to bring the answers that industry and government have long sought on determining the most effective security measures.

## CONCLUSIONS

The early identification of the risk to convenience store employees in the 1970s has led to an overall reduction in robberies since that time. There may have been a reduction, as well, in homicides. Because the greatest risk to retail workers is homicide caused by Type I violence, the concentration for the prevention of homicide for retail workers has been in the right place. That is, the emphasis needs to be on prevention techniques which guard against the criminal actions of third parties, including robbery, assault and homicide.

It is heartening, in a review of the research which has been done to date, to find remarkable agreement on the effectiveness of certain security measures in convenience stores. That evaluation, presented herein, includes the analysis by Kraus and his colleagues at UCLA (1995 and 1996); a case study by Jeffery and Hunter (1992); Reiss and Roth's evaluation at the National Academy of Sciences (1993); and reviews by Amandus (1993) and Amandus and his associates at NIOSH (1996 and 1997).

Hopefully, with this increased understanding of the research that has been done and the research that is currently underway, a clearer vision will emerge of what the goals are, which can only serve to help the efforts to accomplish them. At the very least,

because of consensus on the basic robbery and violence prevention program, work needs to be done toward a more widespread implementation of these validated measures:

**cash control**

**escape routes**

**lighting**

**visibility, and**

**training.**

Cameras and video systems have also become more prevalent. At the same time, we need to wait for the results of the five studies underway to determine the relative effectiveness of the other measures often recommended. Those non-validated measures include:

**two clerks**

**bullet-resistant barriers**

**guards**

**closing at night**

Because the risk of injury is not reduced with one versus two clerks on duty, then even if robberies are reduced by having two clerks, it is not enough to offset the number who would be injured, by having two clerks on duty.

There are times that multiple clerks are on duty or establishments close at night for business reasons, such as sales volume, but these should not be viewed as safety measures, until further study is done. Some of the current studies will address these issues and also answer the research questions of the relationship between homicide and crime in the neighborhood and homicide and its relation to prior robberies.

## REFERENCES

- Amandus H. E. February, 1993. *Protocol for a Case-Control Study of the Deterrent Effect of Environmental Designs on Violent Crime in Virginia Convenience Stores*. Morgantown, W VA: Division of Safety Research. National Institute for Occupational Safety and Health.
- Amandus H. E. Zahm D. Friedmann R. Ruback R. B. Block C., Weiss J. Rogan D. Holmes W. Bynum T. Hoffman D. McManus R. Malcan J. Wellford C. Kessler D. 1996. Employee Injuries and Convenience Store Robberies in Selected Metropolitan Areas. *Journal of Occupational and Environmental Medicine*. 38:7. 714-710.
- Amandus H.E. Hendricks S. A. Zahm D. Friedmann R. Block C. Wellford C. Brensilber D. Bynum T. McManus R. Malcan J. Weiss J. C. Kessler D. May, 1997. Employee Injury in Convenience Store Robberies. *Journal of Occupational and Environmental Medicine*. 39:5.
- Baumer T. L. and Carrington M. D. 1986. *The Robbery of Financial Institutions: Brief Summary*. Washington, D. C. National Institute of Justice, U. S. Department of Justice.
- Bell C. Stout N.A. Bender T.R. Conroy C.S. Crouse W.E. Myers J.R. June 13, 1990. Fatal Occupational Injuries in the United States, 1980-1985, *Journal of American Medical Association*. 263 :22:3047-3050.
- Bell C. 1991. *Female Homicides in United States Workplaces, 1980-1985*. American Journal of Public Health. 81:729-732.
- Biles P. D. April, 1996. *Guidelines for Workplace Violence Prevention Programs for Night Retail Establishments*. WDC: Department of Labor\OSHA.
- California Department of Industrial Relations, Division of Occupational Safety and Health. 1995. *Model Injury and Illness Prevention Program for Workplace Security*.
- Clifton W. Jr. and Callahan P. T. 1987. *Convenience Store Robberies in Gainesville, Florida: An Intervention Strategy by the Gainesville Police Department*. Gainesville: Gainesville Police Department.

- Cook P. J. Robbery Violence. *The Journal of Criminal Law and Criminology*. 1987. 78, (2), 357-375.
- Crow W.J. and Bull J.D. 1975. *Robbery Deterrence: An Applied Behavioral Science Demonstration*. La Jolla, CA: Western Behavioral Sciences Institute.
- Crow W.J. Erickson R.J. and Scott L. 1987. Set Your Sights on Preventing Retail Violence. *Security Management*. 31:60-64.
- Crow W.J. and Erickson R.J. 1984. *Cameras and Silent Alarms: A Study of their Effectiveness as a Robbery Deterrent*. Jackson Hole, WY: Athena Research Press.
- Crow W.J. and Erickson R.J. 1989. *The Store Safety Issue*. Alexandria, VA: National Association of Convenience Stores.
- Currie E. 1985. *Confronting Crime: An American Challenge*. New York: Pantheon Books.
- Davis H. 1987. Workplace Homicides of Texas Males. *American Journal of Public Health*. 77(10), 1290-1293.
- Davis H. Honchar P.A. and Suarez L. 1987. Fatal Occupational Injuries of Women, Texas 1975-84. *American Journal of Public Health*. 77(12), 1524-1527.
- Duffala D. C. 1976. Convenience Stores, Armed Robbery and Physical Environmental Features. *American Behavioral Scientist*. 20:227-246.
- Erickson R.J. 1991. Convenience Store Homicide and Rape. *Convenience Store Security: Report and Recommendations*. Alexandria, VA: National Association of Convenience Stores.
- Erickson R. J. July, 1995a. Homicide in Convenience Stores. *Proceedings of the Third Annual Spring Symposium of the Homicide Research Working Group*. WDC: National Institute of Justice Research Report.
- Erickson R. J. 1995b. Employer Liability for Workplace Violence. Tips on Employment Law. Ed: Robert Fitzpatrick. Chicago, Il: American Bar Association.
- Erickson R. J. April-June, 1996a. Retail Employees as a Group at Risk for Violence. *Occupational Medicine: State of the Art Reviews, Workplace Violence*. 11:2. Philadelphia: Hanley and Belfus, Inc.

- Erickson R. J. 1996b. *Armed Robbers and their Crimes*. Seattle, WA: Athena Research Corporation.
- Erickson R. J. 1996c. *OSHA Guidelines--Meeting of Stakeholders*. November 4, 1996. WDC: unpublished paper.
- Erickson R. J. 1997. Robbers Who Injure and Those Who Do Not. *Proceedings of the 1996 Meeting of the Homicide Research Working Group*. WDC: National Institute of Justice.
- Erickson R.J. and Crow W.J. 1980. Violence in Business Settings. *American Behavioral Scientist*. 23 (5): 717-743.
- Erickson R. J. and Stenseth, A. October, 1996. Crimes of Convenience. *Security Management*. 60-64.
- Figlio R.M. 1991. An Assessment of Robbery Deterrence Measures at Convenience Stores. *Convenience Store Security: Report and Recommendations*. Alexandria, VA: National Association of Convenience Stores.
- Howard J. D. April-June, 1996. State and Local Regulatory Approaches to Preventing Workplace Violence. *Occupational Medicine: State of the Art Reviews, Violence in the Workplace*. Philadelphia: Hanley and Belfus.
- Hunter R. D. 1988. *The Effects of Environmental Factors upon Convenience Store Robbery in Florida*. Tallahassee, FL: Florida Department of Legal Affairs.
- Hunter R. D. 1990. Convenience Store Robbery in Tallahassee: A Reassessment. *Journal of Security Administration*. 13:3-18.
- Hunter R. D. and Jeffery C. R. 1992. Preventing Convenience Store Robbery through Environmental Design. *Situational Crime Prevention*, Ed. Ronald V. Clarke. NY: Harrow and Heston.
- Jeffery C. R. 1971. *Crime Prevention Through Environmental Design*. Beverly Hills: Sage.
- Jeffery C. R. Hunter R. D. and Griswold J. 1987. *Crime Prevention and Computer Analysis of Convenience Store Robberies in Tallahassee, FL*. Security Systems, August, 1987 and Florida Police Journal, Spring, 1987.
- Kraus J. F. 1987. Homicide While at Work: Persons, Industries, and Occupations at High Risk. *Am.Journal of Public Health*. 77:1285-1289.

- Kraus J. F. 1995. Workplace Violence Prevention Project: UCLA Proposal Submitted to the National Institute for Occupational Safety and Health. Unpublished.
- Kraus J. F., Blander B. and McArthur D. L. 1995. Incidence, Risk Factors and Prevention Strategies for Work-Related Assault Injuries. *Annual Review of Public Health*. 16:335-79.
- LaFalce, J. L. September 6, 1994 (personal correspondence). Chairman, Committee on Small Business, House of Representatives, Congress of the United States:WDC.
- Maryland, State of. October, 1988. *Governor's Task Force on Retail Security*. State of Maryland.
- Reiss A.J. Roth JA. 1993. *Understanding and Preventing Violence*. Washington, DC. National Academy Press.
- Schreiber B. 1991. National Survey of Convenience Store Crime and Security. *Convenience Store Security: Report and Recommendations*. Alexandria, VA: National Association of Convenience Stores.
- Swanson R. 1986. Convenience Store Robbery Analysis: A Research Study of Robbers, Victims and Environment. Gainesville, FL: Unpublished report to the Gainesville Police Department.
- U. S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. 1993. NIOSH Alert. *Request for Assistance in Preventing Homicide in the Workplace*. DHHS (NIOSH) Publ. No. 93-109.
- U. S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. (September, 1992). *Homicide in U. S. Workplaces: A Strategy for Prevention and Research*.
- U. S. Department of Health and Human Services. Public Health Service, Centers for Disease Control and Prevention National Institute for Occupational Safety and Health. June, 1996. *Violence in the Workplace: Risk Factors and Prevention Strategies*. *Current Intelligence Bulletin* 57.



- U. S. Department of Justice. 1973. Grant #75NI-99-0002 awarded by the Law Enforcement Assistance Administration to the Western Behavioral Sciences Institute.
- U. S. Department of Justice, Bureau of Justice Statistics. February, 1985. *Special Report. Examining Recidivism*. Washington, D. C.
- U. S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics. July, 1993. *Violence and Theft in the Workplace*. NCJ-148199.
- U. S. Department of Justice, Federal Bureau of Investigation. 1993. *Uniform Crime Reports*.
- U. S. Department of Justice, Federal Bureau of Investigation. 1996. *Uniform Crime Reports*.
- U. S. Department of Labor, Bureau of Labor Statistics. April, 1997. *Fatal Workplace Injuries in 1995: A Collection of Data and Analysis*.
- U. S. House of Representatives. Committee on Small Business. Hearing on Crime and Small Business of "Strategies in the War Against Small Business Crime." WDC.
- Virginia State of. Department of Criminal Justice Services. 1993. *Violent crimes in Convenience Stores: Analysis of Crimes, Criminals and Costs*. Richmond, VA.
- Wilson J. V. 1990. *Convenience Store Robberies: The Gainesville, Florida 2-Clerk Law*. WDC: Crime Control Research Corporation.
- Wilson J. and Herrnstein R.J. 1985. *Crime and Human Nature*. New York. Simon and Schuster.
- Zimring F.E. and Zuehl J. 1986. Victim Injury and Death in Urban Robbery: A Chicago study. *The Journal of Legal Studies* IV (1): 1-39.

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## ABOUT THE AUTHOR

Rosemary J. Erickson, Ph.D. is a nationally known expert on the subject of security. Since 1979, she has been president of Athena Research Corporation. As a sociologist, she has studied the problem of convenience store security for over twenty years, beginning with a study funded by the National Institute of Justice, to determine what would reduce robbery and violence in convenience stores. That work led to the measures seen today in stores nationwide, which include cash control, visibility, lighting and employee training. Dr. Erickson conducts research on homicide, rape and robbery. She conducted a survey of robbers about what they look for when they consider robbing a place, which resulted in the book, *Armed Robbers and Their Crimes*. She develops programs and training based on her research.

Dr. Erickson serves as an expert witness in premises liability cases and has testified on the subject before city, state and federal legislators. In the summer of 1994, she testified before the U. S. House Committee on Crime Against Small Business. She serves as a liaison between business and government and consults with OSHA agencies and the National Institute of Occupational Safety and Health (NIOSH) in planning model programs to protect workers. She has served on the local Seattle\King County Board of Directors for Crimestoppers. Dr. Erickson has received widespread media coverage and has written numerous reports and articles on retail security and homicide in the workplace.