ARTICLE

"Love Our Kids, Lock Your Guns"

A Community-Based Firearm Safety Counseling and Gun Lock Distribution Program

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Background: Safer storage practices may reduce injury rates by limiting youth access to firearms.

Objective: To determine if a firearm safety counseling and gun lock distribution program improved storage practices.

Design: Community-based before-after trial.

Setting: Urban county in central North Carolina.

Participants: One hundred twelve adult gun owners recruited through a mass media advertising campaign.

Intervention: In the parking lot of a shopping mall, participants completed a survey, and were then provided with tailored counseling, gun safety information, a gun lock, and instructions to use it.

Main Outcome Measures: Firearm storage practices, assessed by survey and personal interview (baseline) and telephone interview (6-month follow-up).

Results: Most participants were white (62%), men (63%), had children (58%), and owned a gun for protection (74%). At follow-up, of the 82 participants, 63 (77%) (up from 39 [48%]) reported storing their gun(s) in a locked compartment ($P=.004$), 59 (72%) (up from 0) reported using gun locks ($P=.001$), 61 (74%) (up from 57 [69%]) reported storing their ammunition locked in a separate location, 59 (72%) (up from 52 [63%]) reported storing their gun(s) unloaded, and 6 (7%) (down from 15 [18%]) reported storing firearms unlocked and loaded. Participants with children were more likely at baseline to store weapons unlocked and loaded (38 [59%] vs 19 [41%]; $P=.02$) but were more likely after counseling to lock their weapons (29 [58%] vs 14 [44%]) and remove guns from the home (5 [10%] vs 0 [0%]).

Conclusions: This program prompted reporting of safer firearm storage practices, particularly among parents. Longer follow-up, verification of self-reports and correct use, testing of gun locks, and monitoring firearm injury rates after distribution programs are needed to establish the public health potential of this approach.

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FIREARM INJURY among young people is a leading cause of death and a national epidemic. If trends continue, firearm-related deaths are forecasted to surpass motor vehicle crashes as the leading cause of injury-related death by 2003.[1] In the United States, nearly 6000 people younger than 20 years die of firearm-related injuries each year in the form of homicide, suicide, and self- or other-directed unintentional injury.[2] For each young person killed by gunfire, about 4 are wounded nonfatally, many of whom are permanently disfigured or disabled.[3]

Many unintentional injuries and suicides among youth happen because an unauthorized young person operated a firearm that was obtained from home.[4,5] Unintentional injuries tend to occur when a curious young person plays with or handles an improperly stored firearm in his or her own home or the home of a friend or family member.[4] In addition to developmental risk factors, firearms contribute substantially to the adolescent suicide problem.[5] It has been estimated that as many as 85% of the guns used in youth firearm suicides were obtained from the home of the victim, a relative, or a friend.[4]

Compared with unintentional injury and suicide, the relationship between household firearm ownership and youth homicide perpetration or victimization is less direct. The proportion of guns used in youth-perpetrated homicides that were obtained from youths' homes is not clear. Most firearms used in youth homicides are obtained through theft or from the secondary market.[6] Thus,

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PARTICIPANTS AND METHODS

The project consisted of a community-based firearm safety counseling and gun lock distribution program with baseline and 6-month follow-up data collected from participants. Spearheaded jointly by a law enforcement officer and a pediatrician (T.C.-B.), the program received official, financial, and in-kind support from the law enforcement agency, the mayor, the city council, the county baseball team, the North Carolinians Against Gun Violence, the local Wal-Mart, the Injury Prevention Research Center, and the Department of Pediatrics at the University of North Carolina at Chapel Hill.

STUDY POPULATION

The study took place in an urban county in North Carolina, where the prevalence of gun ownership is estimated to be approximately 40% to 50%. From 1990 to 1995, the county's adolescent homicide rate among youths aged 11 to 18 years was ranked fourth of 100 counties in the state.[18] Although North Carolina has a child access prevention law, our field experience indicates that many citizens appear to be unaware of this rarely enforced law or choose not to adhere to it.

PARTICIPANTS

Program participants, including gun owners and other interested persons, were recruited through a multimedia campaign that included press conferences by the collaborators, newspaper and television advertisements and stories, radio public service announcements, and announcements at baseball games. Churches, community organizations, neighborhoods, clinics, and 200 gun owners (randomly selected from municipal firearm registration files) were also sent letters and flyers about the event. Three days before the event, the mayor participated in a press conference with the collaborators during which he proclaimed the day of the event as Love Our Kids, Lock Your Guns day and encouraged all gun owners to participate. The event was held in the Wal-Mart parking lot in an outdoor shopping mall on a Saturday in October 1998.

PROGRAM DELIVERY

Firearm safety counselors obtained informed consent from the participants and provided assurances of confidentiality. Participants then completed a survey modified from the "Steps to Prevent Firearm Injury in the Home" program.[19] The survey was reviewed by a firearm safety counselor, who provided approximately 10 to 15 minutes of tailored counseling for the participants based on their responses to the survey using key educational points on firearm injury and death from the Steps to Prevent Firearm Injury in the Home program and the American Medical Association's firearm safety guide.[20] If an individual reported owning a gun for protection, alternative security strategies were discussed, such as security alarm systems, motion lights, steel doors with dead bolt locks, and dog ownership. The participant then received a packet of firearm safety information and had the opportunity to view a videotape of *Cease Fire* public service announcements (which show the negative consequences of improper gun storage and the dangers of firearms). Next, the participant was given a maximum of 4 gun locks. Using a display of securely mounted unloaded guns, a law enforcement officer then instructed each participant in how to use the lock on a firearm like the one the participant had at home. Participants also received a T-shirt with the Love Our Kids, Lock Your Guns logo to reinforce the safety message after the event was over and to create "walking billboards" to share the message with people who did not attend. The final activity of the 6-hour program was a raffle of a gun safe.

household firearm ownership is associated with youth perpetration of homicide in that insecure storage practices provide an opportunity for youths to access firearms, primarily through theft.

National studies[7] have reported that more than one third of gun owners keep their weapons loaded either some or all of the time, approximately half of gun owners keep them unlocked, and 20% of firearm-owning households have a loaded unlocked firearm in the home. In the South, firearms in households with children are more than twice as likely to be stored loaded and unlocked than in similar households elsewhere.[8] Many gun owners keep their guns loaded and unlocked in their homes, immediately accessible for protection against an intruder, despite the increased risk for injury and despite data suggesting that most victims are not intruders, but family members or acquaintances.[9,10]

Various strategies, including changes in product design[11] and safe storage laws,[12] have been implemented to prevent young people from operating firearms. Promotion of safe firearm storage, which includes keeping guns unloaded, locked up, separate from ammunition, and stored with an extrinsic safety device such as a gun lock, trigger lock, gun safe, or lock box, represents an important method to prevent unauthorized access and operation of guns. Unlike other strategies, safe storage promotion is politically feasible and relatively inexpensive and can be done at the community level. Although safe storage and the use of extrinsic safety devices may not confer absolute protection against misuse of guns, both are supported by child safety experts and the American Academy of Pediatrics.[13]

Safe storage of firearms is promoted to the public through physician counseling and through public education campaigns conducted by organizations such as health departments, citizen groups, and law enforcement agencies. The effectiveness of firearm safety counseling emphasizing safe storage remains to be established. Two studies conducted in primary care settings did not demonstrate a statistically significant change in gun ownership[14] or in storage[15] after counseling. Some limitations of safe storage promotion in medical settings include the following: (1) it may be restricted to individuals who have access to health care, (2) counseling is often not tailored to the individual's level of risk, (3) safe storage is not the focus of the interaction, and (4) physicians usually do not distribute safety devices. Community-based firearm safety programs and gun lock

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TRAINING OF FIREARM SAFETY COUNSELORS

Educators from the Center to Prevent Handgun Violence, Washington, DC, and one of us (T.C.-B.) trained firearm safety counselors, who were pediatricians, medical students, public health professionals, and other health care practitioners recruited from local health professions schools, government agencies, and health departments. The training program (Steps to Prevent Firearm Injury in the Home) was developed by the Center to Prevent Handgun Violence. Firearm topics covered were as follows: epidemiology of injury, suicide, and homicide; unintentional shootings; guns in schools; emotional and financial costs; approaching parents; key prevention steps; counseling families; and dispelling firearm misconceptions. Steps to Prevent Firearm Injury in the Home program kits and training manuals were provided to all counselors. Counselors were also instructed on how to use the gun lock. Six trained counselors (3 pediatricians, 1 fourth-year medical student interested in pediatrics, and 2 public health professionals) helped to conduct this intervention.

SELECTION OF A GUN LOCK

The gun lock selected for the program was the Keyed Cablelock (bulk cost, $6 each), manufactured by O. F. Mossberg and Sons, New Haven, Conn. The keyed cable gun lock renders weapons inoperable because the gun is necessarily unloaded to install the device, and a plastic-coated steel cable runs through the barrel for a revolver or through the ejection port for semiautomatic guns, rifles, and shotguns. A keyed lock secures the cable (**Figure**). Before choosing the keyed cable gun lock, we rejected several locks that could easily be destroyed by children.

Lock boxes, which are widely recommended by law enforcement officers,[21] were considered, but the expense ($40-$200 each) prohibited using this device in a distribution program during which we wanted to provide the device free of charge to participants. In addition, we were interested in a device that could be adapted to all types of guns, and lock boxes are designed solely for the storage of handguns. Furthermore, we wanted to promote unloading of guns, and a gun can be stored loaded in the box.

Trigger locks were rejected for use in this study because they can be used only on firearms with a trigger guard; gun locks do not have this limitation. If the trigger lock does not fit within the trigger guard tightly, the trigger may still be operable.[22] Moreover, the gun must be unloaded for a gun lock to be applied, whereas a trigger lock can be installed on a loaded gun, even though doing so is not recommended.

DATA COLLECTION

After the initial counseling session, participants were asked to consent to be interviewed by telephone 6 months later. The purpose of the follow-up was to (1) ask participants if they were using the gun locks and, if not, to remind them to do so; (2) inquire about any difficulty using the lock; (3) respond to participants' questions; and (4) assess gun safety and storage practices postintervention. Information from the questionnaire on which safety counseling was based served as the baseline data. A willingness to participate in the follow-up was not required to receive gun locks or firearm safety counseling. The study was approved by the School of Medicine Institutional Review Board at the University of North Carolina at Chapel Hill.

DATA ANALYSIS

Following descriptive analyses, changes in reported storage practices from baseline to follow-up were evaluated with McNemar tests for correlated proportions. If a participant had more than one gun, the one that was least secured determined the code assigned for storage practices.

distribution programs, which have been conducted across the country,[16,17] are an important complement to anticipatory guidance. However, they are often conducted as public service projects, and not as intervention studies with a formal evaluation. In addition, community-based programs usually do not provide tailored firearm safety counseling based on participants' risks.

Our firearm safety counseling program, "Love Our Kids, Lock Your Guns," builds on what has been done previously in this area. First, participants were recruited through a multimedia campaign that included high-profile professionals. The program was community-based, eliminating access to health care as a barrier, and included the distribution of free gun lock safety devices. Trained health care professionals provided tailored counseling and follow-up with participants without time limitations.

The present study is an evaluation of the Love Our Kids, Lock Your Guns firearm safety program. We sought to determine if the provision of firearm safety counseling by trained practitioners in conjunction with the distribution of free gun locks and follow-up resulted in safer gun storage practices, in the use of gun locks, and in participants' inquiring about the presence of firearms in the homes where their children visit.

RESULTS

DEMOGRAPHICS

The age range for the 112 gun owners who participated in the study was 18 to 81 years, 63% were men, 64% were educated beyond high school, 62% were white, 58% had an annual income at or above $30 000, and 58% lived with children (**Table 1**). Most reported owning more than one gun (mean ± SD, 2.6 ± 2.1 guns). The reported reasons for gun ownership were as follows:

Reason	No. (%) of Participants*
Protection against intruders	83 (74)
Hunting	37 (33)
Sport	26 (23)
Other reason	15 (13)
Job requirement	7 (6)

*Percentages sum to more than 100 because most participants had more than one reason for gun ownership.

In terms of types of guns, most had handguns (44%), but 18% had long guns, such as shotguns or rifles. More than a third (38%) of the participants had handguns and long guns in their home.

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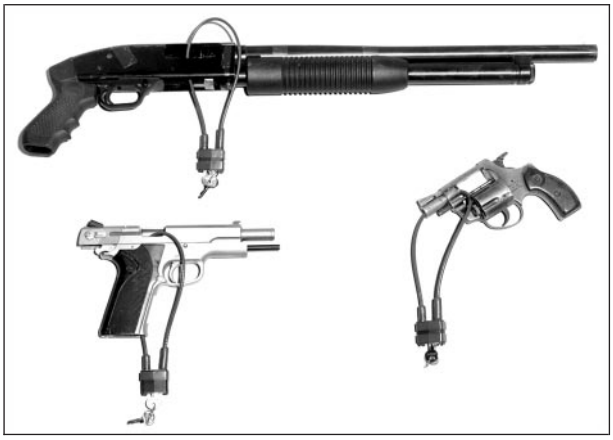

Keyed Cablelock gun lock (O. F. Mossberg and Sons, New Haven, Conn) installed on handguns and a long gun. Photographed by Ed Shenkman Photography, Chapel Hill, NC.

Table 1. Demographic Characteristics of the Program Participants*

Characteristic	All Participants (N = 112)	Follow-up Participants (n = 82)	P
Age, y			
Mean (SD)	45 (14.7)	41 (12.1)	.21
Range	18-81	20-76	
Race			
White	66 (62)	45 (56)	.16
Black	41 (38)	35 (44)	
Sex			
Male	71 (63)	55 (67)	.62
Female	41 (37)	27 (33)	
Educational attainment			
Less than a high school degree	4 (4)	4 (5)	.87
High school degree	34 (32)	25 (31)	
Postsecondary education	67 (64)	52 (64)	
Annual household income, $			
<20 000	15 (14)	7 (9)	.32
20 000-29 999	30 (28)	16 (20)	
30 000-39 999	23 (22)	16 (20)	
40 000-49 999	15 (14)	11 (14)	
50 000-59 999	6 (6)	13 (16)	
≥60 000	17 (16)	17 (21)	
Household composition			
Live alone	17 (15)	10 (12)	.39
Live with other adult(s)	29 (26)	22 (27)	
Live with children	64 (58)	50 (61)	

*Data are given as number (percentage) of participants unless otherwise indicated. Some totals do not sum to 112 or 82 because of missing data. Missing data are not factored into percentage estimates.

STORAGE PRACTICES

Not surprisingly, baseline data demonstrated that many participants did not store their guns in a secure manner. At baseline, fewer than half of the participants (48%) reported keeping their gun(s) locked in a secure compartment, such as a lock box, closet, gun safe, or cabinet. Sixty-three percent reported storing the gun(s) unloaded. Sixty-nine percent reported keeping the ammunition locked and stored separately. Eighteen percent of the participants reported storing the gun unlocked and loaded (**Table 2**).

Table 2. Firearm Safety Practices of 82 Participants at Baseline and at the 6-Month Follow-up*

Storage and Safety Practices†	Baseline	Follow-up
Gun(s) locked up in a compartment	39 (48)	63 (77)‡
Gun(s) unloaded	52 (63)	59 (72)
Ammunition locked and separate from the gun	57 (70)	61 (74)
Use of a gun lock	0	59 (72)‡
Gun unlocked and loaded	15 (18)	6 (7)
Asked friends about ownership and storage§	14 (28)	44 (88)‡

*The response rate was 73% (82/112). Data are given as number (percentage) of participants.

†Participants owning more than one gun were classified according to the one stored in the riskiest manner.

‡P<.05, McNemar test for correlated proportions.

§Analysis included only those participants with children who were interviewed at both periods (n = 50).

Although storage patterns did not differ significantly by race ($P=.32$), sex ($P=.09$), or age ($P=.47$), persons with postsecondary education were 2 times more likely to store their gun unloaded ($P=.02$).

Notably, participants with children were more likely to store their weapons unlocked and loaded than were those without children (38 [59%] vs 19 [41%]; $P=.02$). Sixty-four (58%) participants had children residing in their homes, and 49 (76%) of these parents who owned guns believed that their children did not know where the gun was located. Nine (14%) also reported having children unsupervised at home after school.

FIREARM INJURY RISK BEHAVIORS

Few participants reported known risk factors for firearm injuries among household members. Only 1% reported ever having physical or verbal abuse between people in the home, 5% reported a drinking problem or excessive alcohol use, 5% reported the current use of illicit drugs, and 1% reported current or recent treatment for depression. No participant reported having had gun-related injuries in the home. Although 74% reported owning at least one gun for protection, only 49% had any formal firearms' training and only 39% had installed a security alarm at home.

FOLLOW-UP

Eighty-two participants (73%) were successfully contacted for follow-up between 6 and 12 months after the program. There were no significant differences in demographic characteristics between follow-up participants and those we were unable to reach for follow-up (Table 1). During the telephone interview, 75 (91%) said the counseling and educational materials were helpful. Seventy-seven percent (up from 48%) reported storing their guns in a locked compartment, and 72% reported using the gun lock. Of the remaining 23 (28%) who were not using the lock, 20 (24%) said they had forgotten to put the gun lock on but would do so following this reminder, and 3 (4%) indicated they were not sure they would use the lock. None of the gun owners who stated they were using the gun locks reported any difficulties using the

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locks. One participant reported that the plastic casing surrounding her cable lock split, but that the lock was still operable. Only the following 2 questions were asked by participants: (1) "Where can I get more locks?" and (2) "Were we going to have any more giveaways?" These individuals were sent information on where similar locks could be purchased and the dates of other planned distribution events, respectively.

Individuals who reported using the locks also reported unloading the gun and storing their guns in a locked compartment. Only 7%, down from 18%, said they were storing their guns loaded and unlocked. There were also slight increases, not statistically significant, in the percentages who said they kept their ammunition locked and stored separately and who stored their gun unloaded (Table 2). Also, 88% (up from 28% at baseline) of participants with children stated that they had asked their friends and family about their gun ownership and storage practices (Table 2).

Participants with children were slightly more likely to lock up their weapons after counseling vs participants without children (29 [58%] vs 14 [44%]). Five participants who had children (6% of the total sample, 10% of parents) reported disposing of their firearms after the program. The sample size at follow-up was inadequate to determine statistically significant differences in storage practices between participants with and without children.

COMMENT

Most participants in this program were educated middle-aged white men, with children, who owned at least one gun for protection. Despite North Carolina's child access prevention law, most of these gun owners did not store their guns safely at baseline. Overall, the data do not suggest that gun storage practices differ by race, sex, or age. Responses to our baseline survey were consistent with national data: of the 112 participants, 58 (52%) had an unlocked gun, approximately one third (41 [37%]) kept a gun loaded, and 20 (18%) stored a gun unlocked and loaded.[7,23] The gun lock distribution and firearm safety counseling program led to reported improvements in firearm storage by the participants and more inquiries into the firearm storage practices in homes where children visit. Most participants (79 [96%] of 82) reported intending to use the gun lock, and 62 (76%) reported doing so without problems at follow-up. The use of gun locks did not appear to lead to more lax storage practices, such as not storing the gun in a locked compartment. During counseling, it was emphasized that the gun locks should be used as an adjunct, not an alternative, to safe storage.

This project demonstrated effectiveness, unlike the 2 previously published studies[14,15] that evaluated firearm safety counseling programs, probably because individuals self-selected into the study and were, thus, somewhat motivated to learn and change their storage behaviors. The program's success was also likely because of the following: (1) it took place in a community setting; (2) unlike in a primary care setting, where generally women take children to appointments, we were able to attract men, the actual gun owners; (3) we provided "tailored" counseling; (4) we did not have time limitations for participant counseling; and (5) it was preceded by a multimedia campaign using high-profile community professionals. Participants were also given gun locks—free of charge—to eliminate a financial barrier that may not be accomplished by discount coupons for safety devices used in other programs.[16] Finally, our outcome was an improvement in storage patterns, rather than a change in gun ownership. We found that few participants were willing to get rid of the firearms.

Participants with children were more likely to leave guns unlocked and loaded, a result seen in other studies[8] examining households in the South, but were also more likely to change their storage habits after counseling than participants without children and were the only participants to dispose of firearms. These findings emphasize the potentially valuable role of pediatricians working along with other health care and public health professionals, counseling participants, parents or not, in a community-based setting. Because of the significant finding in this and other studies that gun owners with children are more likely to practice unsafe storage practices, pediatrician advocacy for community-based programs and advising parent participation in such programs may be important. Although ownership of firearms for protection was a predominant theme, it was interesting that few participants reported obtaining any formal firearms training or installing a home security system.

A limitation of this study is that it involved a small number of participants in a single county. There was no comparison group, although it is unlikely that changes of this magnitude occurred so quickly from secular change. By studying changes in storage practices with the least-secured gun, if more than one was owned (which was the case with most participants), the study results are probably skewed to show less change in behavior as a result of the intervention. The data are entirely based on participants' self-reports, and the possibility exists that the safety counseling program could have prompted socially desirable responses at follow-up. Follow-ups using home inspection visits are needed to exclude this possibility. Even if participants accurately report their storage practices, inspections by trained staff may nevertheless be necessary to ensure correct use of the gun lock. Although the keyed cable gun lock is relatively easy to use, the same can be said of child safety seats, which are used incorrectly by approximately 80% of well-intentioned parents.[24] Also, this program only measured short-term (6-12 months) behavioral change. It will be important to determine if safe storage of firearms will be maintained in the long-term.

The gun lock distribution program we conducted had several features typically absent from most gun lock distribution programs. Each participant received tailored firearm safety counseling provided by firearm safety counselors trained through a certified program and based on the participant's risk factors and gun storage habits. The distribution program was conducted in a nonthreatening environment, an outdoor shopping mall, rather than a police station, courthouse, police firing range, or other law enforcement setting that may inhibit some gun own-

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ers. Distribution in a community setting rather than a primary care setting allows for improved access for individuals who do not have access to primary care. Police officers demonstrated correct use of the gun lock on firearms similar or identical to those of the participants and then watched while the participants tried installing the gun lock. Our program also provided follow-up and continued educational support and reinforcement through the telephone interviews and letters at 6 months and the T-shirt they received.

CONCLUSIONS

These data suggest that a community-wide awareness program using a high-profile, multimedia, public education campaign; tailored firearm safety counseling; and gun lock distribution with a demonstration of proper use promoted reports of safer firearm storage and use of gun locks among participants. Gun owners will ask friends, family, and neighbors about gun ownership and storage once they are educated about the prevalence of gun ownership and the epidemiology of firearm injury. Longer follow-up, validation of self-reports of safer storage practices, verification of correct use of the gun lock, rigorous product testing of gun locks, and monitoring of firearm injury rates in areas with large-scale gun lock distribution programs and in comparison areas are needed to establish the public health potential of this approach.

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