

Effectiveness of Gun-Safety Counseling and a Gun Lock Giveaway in a Hispanic Community

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Objective: To evaluate the effectiveness of gun-safety counseling, a gun-safety brochure, and a free gun lock in subsequent gun removal and safe storage.

Methods: In a predominantly Hispanic pediatric clinic, gun-owning families were identified and assigned to either an intervention group (gun-safety counseling, gun-safety brochure, and a free gun lock) or a control group (usual anticipatory guidance). Families were resurveyed 1 month later for changes in the proportion of gun owners, changes in frequency of unloaded and locked gun storage, and changes to the use of locked storage.

Results: Two hundred six (7.8%) of the 2649 parents initially surveyed kept guns in their households. At follow-up, 16% of the control group removed all guns from their homes as compared with 22% of the intervention group ($P = .41$). Among the families who received the intervention, 61.6% either removed all guns from their homes or improved their gun storage safety practice in some way. Only 26.9% of the families in the control group showed similar types of improvement ($P < .001$). In those households still with guns at follow-up, 50.9% of the inter-

vention group had some type of improvement in safe gun storage compared with 12.3% of the control group ($P < .001$). More specifically, 25.0% in the intervention group improved the frequency of locked storage of guns compared with 4.8% of those in the control group ($P = .003$). Twenty-six percent of the intervention group improved the use of locked storage compared with 3.1% in the control group ($P < .001$).

Conclusions: A brief gun-safety counseling session supported with written information along with a gun lock giveaway resulted in significant improvements in safe gun storage behaviors. It did not significantly influence the removal of guns from the home. This study gives support to the recommendations of the American Academy of Pediatrics (Elk Grove Village, Ill) and other professional organizations to discuss gun safety with families and encourages research in this area. It also suggests that providing tools such as gun locks to enable the desired behavior may improve safe storage.

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GUN-RELATED DEATH AND injury are a major public health problem in the United States, resulting in tremendous losses to society, especially in the pediatric and young adult population. In 2001, 2937 children and teenagers died as a result of gun-related injuries. Sixty-one percent of all gun-related deaths among children were the result of homicide and 32% were attributed to suicide.¹ Gun ownership has been identified as a risk factor for homicide and suicide in the home.^{2,3} The American Academy of Pediatrics (Elk Grove Village, Ill) recommends violence prevention anticipatory guidance at every health maintenance visit, including urging gun removal from homes.⁴ The American Academy of Pediatrics also supported the evaluation of safe storage techniques such as lock boxes and gun locks.⁵

Pediatricians agree that handguns in the home are hazardous and that steps

should be taken to reduce this hazard through legislation and parent counseling.⁶ Children attending public urban pediatric clinics are exposed to guns in their homes, and their parents appear to be receptive to gun-safety counseling.⁷

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A significant percentage of gun-owning parents store their guns loaded or unlocked, substantially underestimating the risk of injury to their children.⁸ Yet despite these facts, most practitioners fail to counsel on gun safety with only 1 in 5 counseling more than 10% of their patient families.⁹

In spite of these recommendations, current evidence generally does not support gun-safety counseling. Previous studies of gun-safety counseling in a pediatric out-

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Table 1. Questions Pertaining to Guns in Baseline and Follow-up Questionnaires

Question	Response Type
Baseline and follow-up questionnaire	
Is there a gun (handgun or rifle) currently kept in your household?	Yes/no/not sure
Have you discussed with your children what to do if they find a gun?	Yes/no/not sure
How many guns are kept in the household?	Choices to circle are 1, 2, 3, or more than 3
What type(s) of gun(s) is (are) kept in the household?	Choices to circle are handgun, rifle, or both
Is (Are) the gun(s) kept loaded?	Likert scale*
Is (Are) the gun(s) stored in a safe, in a lock box, or with a gun lock? (Specify which.)	Write in
Does your child know where the guns are kept?	Yes/no/not sure
Follow-up questionnaire only	
Were any or all of the guns that you had 1 month ago removed from your household?	Yes/no/not sure
The reason you choose to keep a gun in your household is	Choices to circle are protection, sport/recreation, required for occupation, collector, and other
Has your child's doctor ever spoken to you about gun safety?	Yes/no/not sure
Did your child's doctor seem knowledgeable about gun safety?	Yes/no/not sure
Was the advice your children's doctor gave you helpful in deciding whether to keep a gun in your household or how to store your gun?	Yes/no/not sure

*Likert scale responses are always, most of the time, some of the time, and never.

patient setting have not shown significant changes in household gun ownership or storage patterns.^{10,11}

Furthermore, gun-safety counseling as well as gun ownership patterns in the Hispanic population have been understudied. The impact of gun-related morbidity and mortality on the Hispanic community is disproportionately high when compared with the population as a whole. Hispanic people are far less likely to own guns¹² yet are murdered with guns at rates second only to those for black people. Gun homicide was the leading cause of death for Hispanic people aged 15 to 34 years.¹ The data suggest that efforts to prevent gun injury and death should focus special attention on minority populations.

Our objective was to determine the effectiveness of a single, brief gun-safety counseling session within the context of a pediatric visit that was then reinforced with written material and a donated gun lock.

METHODS

SITE

This study was conducted at a pediatric clinic within the El Rio Community Health Center in Tucson, Ariz. This urban community health center is the largest of its kind in the state and the 29th largest in the United States. The El Rio Community Health Center serves a population that is approximately 85% minority (59% Hispanic, 16% unreported, 14% white, 8.6% Native American, 2% African American, 0.4% Asian or Pacific Islander).

SUBJECT SELECTION

At check-in, all parents of children younger than 18 years old were asked by the bilingual front-office staff to complete an anonymous safety questionnaire in English or Spanish for a study being conducted at the clinic. Along with general safety questions and basic demographic information, the questionnaire contained embedded questions that specifically addressed gun ownership, type and frequency of gun storage, and whether or not the gun was kept loaded. Respondents were screened for gun ownership with the question, "Is there a gun (handgun or rifle)

currently kept in your household?" Questions that were not simply yes/no responses used a 4-point Likert scale (never, some of the time, most of the time, always). Pertinent questions relating to guns contained in the questionnaire are listed in **Table 1**. Upon receiving the completed baseline safety questionnaire back from the parent, a member of the front-office staff reviewed it only to ascertain whether the parent was a gun owner. Families not owning guns were excluded from study participation. Informed consent was obtained in the parent's preferred language from gun-owning families willing to participate in the study. A family could participate only once in the study.

DESIGN

The study used a nonconcurrent, controlled pretest-posttest design. The control group was recruited prior to the intervention group and prior to the providers having any specific knowledge of the study. Previous studies have shown that few providers perform regular gun-safety counseling,⁹ so we assumed that very few families in the control group received counseling. After the recruitment of the control group, the providers were given training in gun-safety counseling. The training was facilitated by 1 of us (P.S.C.) using the program Steps to Prevent Firearm Injury in the Home (STOP 2).¹³ All of the 9 possible providers during the study period were board-certified pediatricians and all chose to participate in the study.

The program STOP 2 was designed for all health care providers across disciplines who work with diverse patient populations. It is an educational program developed jointly by the American Academy of Pediatrics and the Brady Center to Prevent Gun Violence (Washington, DC) to use when counseling patients on the inherent risk of guns in the community.

During the 30-minute training presentation by 1 of us (P.S.C.), each provider received a STOP 2 kit. The kit consisted of a health care provider reference manual, family brochures, and posters. The patient portions of the kit were printed in both English and Spanish. The brochures in the packet were identical to those given to families recruited to the intervention group. Providers were instructed to comply with a standardized 1- to 2-minute message to the gun-owning participant families during the visit. Two simple messages were given to all families in the intervention group in accordance with the STOP 2 program: first, "a gun in your home is a risk to your

family,” and second, “the safest thing is not to keep a gun in the home, but if you keep a gun, unload it and lock it up.” A Spanish language translator was available.

One week after providers were trained in gun-safety counseling, the intervention group was recruited. Data were collected and compared by using baseline and follow-up questionnaires. A timeline of the study is shown in the **Figure**.

INTERVENTION

All families in the intervention group received the physician gun-safety counseling previously described, a STOP 2 family brochure to reinforce the counseling, and a gun lock with printed instructions on its use. Clinic staff clearly identified families in the intervention group for the provider by attaching a STOP 2 patient brochure and a gun lock to each medical record placed outside the examination room. The gun lock used in the study was the Universal safeTclaw from Safegun Corporation (Forestville, Md). It fits all handguns and long guns in all calibers and has illustrated instructions. Its list price is \$6.99.

One month after their respective enrollments, participants in both the control and intervention groups were mailed a follow-up questionnaire. The follow-up questionnaire ascertained data regarding any removal of guns since enrollment along with any changes in gun storage patterns. With regards to gun storage patterns, subjects were asked about the frequency of unloaded storage (gun lock-independent behaviors) as well as the type and frequency of locked storage (gun lock-dependent behaviors). Questions in the follow-up questionnaire regarding the presence of guns in the household and the type and frequency of storage were identical to those in the baseline questionnaire. Study subjects who did not return the follow-up questionnaire after 2 weeks were contacted by a research assistant and asked to complete the survey by telephone.

OUTCOME ASSESSMENT

The primary outcomes of this study were 2-fold. The first was the removal of all guns from a household, which was ascer-

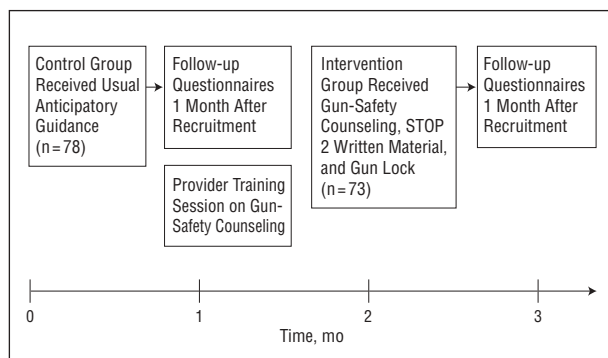


Figure. Study timeline. STOP 2 indicates Steps to Prevent Firearm Injury in the Home.

tained by asking, “Is there still a gun currently kept in your household?” at follow-up. The second was the improvement of gun storage by subjects who kept a gun in the household at follow-up. **Table 2** outlines the 4 different ways improvement could occur and how each was defined.

Comparisons between the control and intervention groups were made by using the χ^2 test with a 2-tailed $\alpha < .05$ considered statistically significant. We analyzed the outcomes of gun storage behavior in 2 ways. First, we compared the percentage in each group demonstrating improvement in each behavior using the χ^2 test. Second, we compared the change in baseline and follow-up Likert scale responses using the Mann-Whitney *U* test.

None of the distributions of the potentially confounding variables were significantly different between the intervention and control groups ($P < .10$). Because of our sample size, however, we confirmed our findings using logistic regression, adjusting for a teenager in the household, primary language spoken at home, perceived danger of the neighborhood, and type of gun in the household. None of these variables significantly altered our results and are therefore not included. The investigational review board of the El Rio Community Health Center approved the study.

RESULTS

Baseline questionnaires were completed by 2649 families. Of these, 206 (7.8%) reported 1 or more guns at home. Informed consent was obtained for 180 (87.4%) of these gun-owning families. In the 26 cases where informed consent was not obtained, all were due to oversight of the research team rather than family refusal. Of the 180 consenters, 151 (83.9%) successfully completed both the baseline and follow-up questionnaire. Overall, the study was completed on 73.3% (151/206) of the original gun-owning families. The percentage of families that required telephone follow-up was 41% in both the control and intervention groups.

Baseline characteristics of control and intervention groups were similar (**Table 3**) with the exception that the control group was significantly more likely to have proper storage of their guns at baseline (65.4% vs 46.6%, $P = .05$). Mean Likert scale scores were similar at baseline between the control and intervention groups with regard to frequency of gun storage, use of storage devices (including gun locks), and frequency of storing guns unloaded (data not shown).

Did the intervention improve overall gun-safety practices? At follow-up, families who received the intervention were more likely to have improved overall gun-safety practices compared with the control group (61.6% vs 26.9%; relative risk [RR], 2.29; 95% confidence interval [CI], 1.52-3.44; $P < .001$).

Table 2. Type and Definition of Improvement in Safe Gun Storage

Type	Definition
Any improvement	One or more of the types of improvements listed below
Greater frequency of locked storage (the amount of time a gun is stored with a gun lock and/or with a lock box)	A positive change in Likert scale score at follow-up compared with baseline (never, some of the time, most of the time, always)
Improved type of gun storage	A positive change in Likert scale score at follow-up compared with baseline (none, lock box or a gun lock, lock box and a gun lock)
Greater frequency of storing gun unloaded	A positive change in Likert scale score at follow-up compared with baseline (never, some of the time, most of the time, always)

Did the intervention decrease gun ownership? At follow-up, 13 (16.6%) families in the control group and 16 (22%) families in the intervention group reported having removed all guns from the home (RR, 1.31; 95% CI, 0.68-2.54; $P = .41$). In addition, 8 (10.2%) families in the control group and 7 (10%) families in the intervention group reported removing some (but not all) guns from the home (RR, 0.96; 95% CI, 0.54-1.70; $P = .89$).

Did the intervention improve safe gun storage? To assess the impact of the intervention on families improperly storing guns at baseline, we excluded all families who at follow-up had removed all guns from their home. In the next few paragraphs, we examine each variable of safe gun storage as defined in Table 2.

When gauging any improvement, we found that 50.9% of respondents in the intervention group improved either their gun lock storage frequency, their gun storage type, or the frequency of storing a gun unloaded. This was compared with 12.3% of those respondents in the control group. This difference was statistically significant (RR, 4.13; 95% CI, 2.06-8.30; $P < .001$; **Table 4**).

Regarding the frequency of locked storage, 25% of the intervention group showed some improvement at follow-up in the frequency a gun was stored with a gun lock

or in a lock box compared with 4.8% of the control group (RR, 5.20; 95% CI, 1.59-17.32; $P = .003$; Table 4). This finding was confirmed by comparing the Likert scale change between the 2 groups with the intervention group having a significantly improved frequency of storage compared with the control group (Mann-Whitney U Test, $P = .01$). Because the control group was slightly more likely, although not significantly so, to always store guns with a gun lock or lock box at baseline, we also repeated the analysis with only those families who at follow-up still owned a gun and at baseline were not always properly storing their guns. The results remained similar with greater improvement seen among the intervention group (RR, 3.18; 95% CI, 1.10-9.19; $P = .02$).

With regard to the type of storage used, at follow-up 26.3% of the intervention group improved their type of storage compared with only 3.1% of the control group (RR, 8.55; 95% CI, 2.04-35.81; $P < .001$; Table 4). Again, this finding was confirmed by comparing the Likert scale change between the 2 groups with the intervention group being significantly more likely to use a proper storage device at follow-up compared with the control group (Mann-Whitney U test, $P < .001$).

The frequency with which the families stored their guns unloaded at follow-up did not significantly differ between the intervention and control groups (RR, 2.25; 95% CI, 0.82-6.18; $P = .11$; Table 4). This finding was confirmed by comparing the Likert scale change between the 2 groups (Mann-Whitney U test, $P = .45$). Because the control group was slightly more likely, although not significantly so, to always store guns unloaded at baseline, we also repeated the analysis with only those families who at follow-up still owned a gun and at baseline were not always storing their guns unloaded. The results remained similar with no difference seen between the control and intervention groups (RR, 1.00; 95% CI, 0.49-2.05; $P = 1.00$; Table 4).

In all outcomes measured, no results were significantly changed in multivariate analysis (data not shown). However, those in the intervention group who owned a handgun were more likely to show overall gun storage improvement when compared with those who owned only a rifle ($P < .05$). None of the other variables listed in Table 3 predicted improved gun storage behavior.

Of the 43 families in the intervention group who were not using gun locks at baseline, 12 (27.9%) were using gun locks at follow-up. Of the 43 similar families in the control group, 7 (14.9%) were using gun locks at follow-up (RR, 1.45; 95% CI, 0.94-2.23; $P = .13$).

Table 3. Baseline Characteristics of Control and Intervention Group

Characteristic	Control Group (n = 78)	Intervention Group (n = 73)
Child age, mean (SD), y	5.9 (5.4)	6.5 (5.9)
Households with at least 1 male child, %	71.1	80.0
Households with more than 1 child, %	73.7	74.6
Households with at least 1 teenager, %	39.0	45.5
Male head of household, %	84.2	82.1
Annual household income <\$20 000, %	52.1	51.5
Spanish language, %	23.4	26.0
Own gun for protection, %	64.0	75.3
Perceive neighborhood as dangerous, %	15.4	11.0
Know any victims of violence, %	43.6	30.1
Guns in household, mean (SD), No.	1.9 (1.1)	1.6 (0.9)
Handgun owners, %	61.5	72.6
Gun always locked, %	74.3	63.0
Lock box or gun lock used for storage, %	64.1	72.6
Guns always stored unloaded, %	84.6	71.3
Gun lock usage, %	21.5	23.5
Proper gun storage, %*	65.4	45.2

*Proper gun storage is defined as a gun that is always stored unloaded in a lock box or secured with a gun lock.

Table 4. Percentages of Families Improving Gun Storage After Intervention Among Households Still With Guns at Follow-up*

Improvement	% (No./No.)		Relative Risk (95% Confidence Interval)	P Value
	Control	Intervention		
Any improvement in gun storage	12.3 (8/65)	50.9 (29/57)	4.13 (2.06-8.30)	<.001
Greater frequency of locked storage	4.8 (3/63)	25.0 (14/56)	5.20 (1.59-17.32)	.003
Improved type of gun storage	3.1 (2/65)	26.3 (15/57)	8.55 (2.04-35.81)	<.001
Greater frequency of storing gun unloaded	7.8 (5/64)	17.5 (10/57)	2.25 (0.82-6.18)	.11

*Each denominator represents those subjects who did not remove all guns from the household at follow-up. Each numerator represents those subjects who showed improvement at follow-up with regard to the outcome being measured.

This study provides reason to be optimistic about the effectiveness of a brief gun-safety counseling session, reinforced with written material and a gun lock giveaway. Overall, those gun-owning families who received the intervention were more than twice as likely to show some type of improvement in their gun-safety practices. More specifically, although our intervention did not appear to significantly influence the removal of guns from the home, it did significantly improve safe gun storage practices.

Of those who chose not to remove all guns from their home, the greatest improvements were seen in gun lock-dependent behaviors (type of storage and gun lock storage frequency) as opposed to gun lock-independent behaviors (the frequency of unloaded storage). Given this, one might speculate that the critical part of the intervention was the gun lock giveaway. Although only one quarter of the gun locks that were given out were reportedly used, almost twice as many families in the intervention group were using gun locks at follow-up compared with the control group. This trend, however, did not reach statistical significance. A recently published study of gun owners who were native to Alaska showed similar rates of acceptance of free trigger locks.¹⁴

To our knowledge, this is the first trial of gun-safety counseling in an outpatient pediatric setting that has shown a positive effect of such an intervention. The intervention fit into the time constraints of a health supervision visit and was well received by providers and patients. Given the gravity and pervasiveness of this public health problem, our findings suggest that an increased effort be made to address gun safety during well-child visits.

Our finding that handgun owners were more likely to improve gun storage behaviors compared with long gun owners may make this group an especially good target for further interventions, as suggested by the American Academy of Pediatrics recommendations for gun-safety counseling. Considering that handguns account for the majority of deaths and injuries from guns in the United States,¹⁵ any improvement in their storage could potentially lead to a significant decrease in gun-related morbidity and mortality. The STOP 2 program focuses on the danger of handguns, and thus the improvements in storage might be related to the strength of that message.

We hypothesize that our results differ from prior studies showing educational interventions to be ineffective because we formed a partnership with local law enforcement that enabled us to give free gun locks directly to gun-owning families along with counseling. The gun lock might have provided a cue to action, which is felt to impact health behavior decisions, that led to the desired gun storage behaviors.¹⁶ Injury prevention efforts are most effective when combining an array of health education and behavior change strategies such as counseling and the provision of subsidized safety devices.¹⁷

To our knowledge, this is one of only a few studies to examine a gun-safety intervention in a predominantly Hispanic community.¹⁸ A previous survey has shown a gun ownership rate of 14.7% among Hispanic families com-

pared with 43% of white families with children.¹² This is slightly higher than the 7.8% gun ownership rate in our study. Data from the same survey, however, showed lower gun ownership rates for families living in poverty, families with lower education levels, and families living in the western United States, all attributes of the majority of families in our study.

This study has some limitations. Given the nonconcurrent design, it is important to note that we know of no significant community gun-related program or event that occurred during the study period that might have influenced the results. We were also limited by an assumption that all guns in a given household were stored in a similar fashion. Finally, reliance on self-report of behaviors can introduce bias. This is especially relevant in this study given the socially and politically charged nature of gun ownership in this country coupled with the vulnerability sometimes felt by the Hispanic population in the Southwest. However, the successful integration that the El Rio Community Health Center has achieved in its community and the lack of child safety lock and child access prevention laws in Arizona make us confident that such a bias is minimized. Previous studies validate the self-reporting of gun ownership,^{19,20} although evidence validating self-reporting of gun storage patterns is lacking.

We found that a brief gun-safety counseling session reinforced with written material and a gun lock giveaway resulted in improvement in safe gun storage practices. It did not, however, appear to significantly influence the removal of guns from the home. This study provides support to the American Academy of Pediatrics recommendations to discuss gun safety with families and encourages further research in this area.

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Treatment of influenza: quinine, the hydrochloride, daily as prophylactic, has specific action as shown by experience with hussars at Bonn during the epidemic of 1889-90. Cinnamon is a valuable remedy, if used early the patient will return to his usual avocations within 3 or 4 days.

—From *Materia Medica Pharmacy and Therapeutics*, 1906