Money for Guns: Evaluation of the Seattle Gun Buy-Back Program

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Synopsis

Community involvement in local firearms policy is advocated to be an important component of efforts to curtail violence. *This report* ***describes the first evaluation of one such effort, a gun buy-back program conducted in Seattle, WA, during the fall of 1992.***

The evaluation included (a) surveys of 500 participants and a description of the firearms exchanged; (b) monitoring police reports, trauma center admissions, and medical examiners' data to assess short-term effects on the frequency of firearm-related events; and (e) an assessment of community beliefs by random-digit dialing, telephone interviews of 1,000 residents.

Of the 1,172 firearms relinquished, 95 percent were handguns, 83 percent were operational, and 67 percent were owned for more than 5 years. Twenty five percent were exchanged by women. The mean age of participants in the exchange program was 51 years. Females and persons in older age groups were more likely than males (83 percent versus 70 percent, P <0.01) and minors (88 percent versus 55 percent, P <0.05) to select safe disposal as motivation to participate.

Comparing firearm-related events per month before and after the program, crimes and deaths increased, and injuries decreased, but the changes were not statistically significant. Telephone interviews revealed broad support for publicly funded gun buy-back programs even among households (61 percent) with firearms.

Gun buy-back programs are a broadly supported means to decrease voluntarily the prevalence of handguns within a community, but their effect on decreasing violent crime and reducing firearm mortality is unknown.

IN MANY COMMUNITIES throughout the United States, violence resulting in serious injury and death has increased sharply in recent years, causing enormous human suffering (1,2) and draining health care resources (3,4). The effects of violence are most evident among urban young people (5). Homicide and suicide are among the leading causes of death for adolescents and young adults (6). There is increasing evidence that the widespread availability of handguns contributes to the frequency of fatal violence (7-11). Urban youth report having ready access to dangerous weapons and carry firearms for a sense of safety, status, or "survival" (12).

Many interventions aimed at decreasing the availability of handguns have been tried. Such efforts include national (13), State (14), city *(15,16),* and community level initiatives. Because of the power and influence of gun lobbies, voluntary efforts to curtail gun availability may be more feasible and have greater appeal than legislative or regulatory approaches. Programs tried in a number of communities include the offer of an incentive, such as cash,

concert tickets, or merchandise (17,18), to "buy back" guns from citizens, thereby removing firearms from the community. No evaluation of such programs has been reported, despite the need to determine how well they work. This study was undertaken as a multifaceted evaluation of one such gun buy-back program conducted in Seattle, WA, during the fall of 1992.

Historical Background

Almost 20 years ago, the city of Baltimore undertook a program in which, over a 3-month period, 13,000 firearms were collected as part of a gun buy-back program. Since then, many more cities have conducted gun buy-back programs, a few have repeated their programs (Rochester, NY), and at least one city (Boston, MA) has institutionalized its program, encouraging citizens to "buy a handgun" by contributing money on an ongoing basis (19). Although these programs are popular, proof of overall effectiveness is lacking, and published evaluations do not exist.

Seattle Gun Buy-Back Program

During one weekend in the spring of 1992, three shootings occurred in a single neighborhood in Seattle, resulting in serious injury to three teenagers, two of whom died. Proposals from a town meeting called in response to this weekend of violence included a decision to coordinate a gun buy-back program. A coalition of State and urban civic leaders, financial institutions, and small business owners formed the "Stop the Violence Committee." Their goal was to raise $100,000 in donations to be used in exchange for 2,000 handguns or modified long guns. Firearms were collected from 9 am to 5 pm during 6 working days between September 1 and 18, 1992. The program was interrupted and restarted during this period, depending on the availability of sufficient funds. The Seattle Police Department offered its facilities and personnel for the safe transfer of weapons and provided a temporary repository for the firearms collected. A $50 voucher was provided to each participant who turned in a firearm, regardless of the number of guns relinquished.

Methods

We evaluated the program using three sets of data: an anonymous survey of participants and a description of firearms exchanged; police, medical record, and medical examiner data to assess any short-term effect on the frequency of firearm-related crimes, injuries, and deaths; and an assessment of community awareness, expectations, and support for gun buy-back programs, using telephone interviews with a sample of adult Seattle residents identified through random-digit dialing (20,21).

The research protocol was approved by the Human Subjects Review Committee of the University of Washington.

Participant information. During the gun exchange, officers from all four city police districts filed a police incident report including date, time, a general description of the firearm, and an estimate of the participant's age and sex. Following exchange of the firearm and receipt of a voucher redeemable for cash at a local bank, the first 915 consecutive participants were handed a voluntary, anonymous, 1-page survey form and a stamped return envelope. The survey requested information about the participant (age, sex), the firearm exchanged (type, monetary worth, duration of ownership), number of guns owned, and reasons for both gun ownership and gun buy-back participation. A numeric code linked the police report, the survey, and the bank voucher.

Firearm-related crimes, injuries, and deaths. Data detailing firearm events were obtained from records routinely collected by the Harborview Medical Center's trauma register, which serves as the regional Level I Trauma Center, treating more than 95 percent of all King County firearm injuries. The King County Medical Examiner's Division supplied the data on firearm deaths, and the Seattle Police Department had reports on firearm crimes. Firearm events per calendar month were compared for the 6 months after the Seattle Gun Buy-Back Program (SGBBP) (October 1, 1992, to March 30, 1993) versus both the entire year before (September 1, 1991, to August 31, 1992) and the same 6 calendar months in the preceding year (October 1, 1991, to March 30, 1992). The results of these two analyses were similar, and therefore only data comparing the mean monthly number of firearm events for 6 months after the program to the earlier 12-month time period are shown.

Crimes included assaults, robberies, and homicides, both total and firearm-related, occurring within the jurisdiction of the Seattle Police Department. For the analysis of the crime data, firearm homicides that resulted from interventions by the police were excluded.

Analysis of admissions for firearm injuries to Harborview Trauma Center included persons with a

home address within Seattle. Persons with gunshot wounds transferred to the trauma center but not residing in the city were excluded.

The Medical Examiners' data excluded those fatally injured who were transported from outside King County for care. Victims who were shot within the county, transferred to the trauma center, and died are included in Medical Examiners' data as a firearm death occurring in Seattle.

Community awareness, expectations, and support. In the 1990 U.S. Census data, Seattle included 236,702 households, and an estimated 98.2 percent of households in the county have telephones. Six weeks following the SGBBP, 1,000 telephone interviews were completed with a sample of adults identified through random digit dialing. Valid numbers were called back a total of four times during different days and times to minimize nonresponse bias. Ten percent of the persons called in the surveys were recalled by the project supervisor to verify participation. Persons younger than age 18, or those with a hearing impairment or a language barrier, were considered ineligible. The anonymous interview sought the following information: age, sex, household income, household composition, the presence or absence of firearms in the household by type, and the respondent's expectations, beliefs, and support for the SGBBP.

Statistical analysis. Bivariate analyses were conducted using the Yates-corrected chi-square statistic or Fisher's exact test. The chi-square test for trend was used to test the association between firearm ownership and age or income groups (22). The risk ratios with Taylor Series 95 percent confidence intervals are given. Student's t-test was used to examine the effect of the SGBBP on the mean number of firearm events per month, before and after the program, using the calendar month as the unit of analysis. All P-values reported are two-tailed.

Results

Police reports. A total of 1,471 police reports were filed for a total of 1,772 firearms collected. Following are reasons for the disparity: incident reports were filed for the first firearm only, police officers were unable to keep pace with the number of firearms turned in, and some people who submitted firearms refused to accept a voucher. A total of 1,624 vouchers were exchanged for money at local banks.

According to police reports, 24 percent of SGBBP participants were female, and the estimated mean age of participants was 44.3 years (SD=16.8). Five percent of participants were estimated to be younger than age 21, and 12 percent were thought to be older than age 69. Sex was missing on 15 percent of the police reports and age on 25 percent.

Ninety-three percent of firearms exchanged were handguns. Firearms submitted had serial numbers checked in a data base maintained by the National Crime Information Center of the Federal Bureau of Investigation. Thirty-three firearms (1.8 percent) collected had been reported as stolen.

Participant survey forms. Fifty-five percent (500) of the first 915 participants completed and returned the survey. Twenty-four percent of the respondents were female. The self-reported mean age was 51.1 years (range of 11 to 91 years). Minors (younger than age 21) comprised 2.4 percent of the survey respondents, and 21 percent of respondents were older than age 69.

For those completing a participant survey, the vast majority (95 percent) submitted handguns, and almost all of the respondents indicated that the firearm exchanged was operational (83 percent) or its functional status was unknown (14 percent). Only 19 modified long guns were exchanged. The original cost of 45 percent of the firearms was unknown, 14 percent were reported to cost less than $25, and for 15 percent of the guns, the original cost exceeded $100. The duration of ownership preceding the SGBBP exceeded 5 years for 67 percent of the firearms.

Common reasons for owning the firearm exchanged included personal or family protection (30 percent), inherited or a gift (24 percent), and sport and recreation (16 percent). Although owning the firearm for "status" (2 percent) or "never know when you might need one" (3 percent) were infrequently cited reasons for ownership, the two reasons combined were reported 10 times (RR, 10.1; 95 percent confidence intervals [CI] 4.7 to 21.8) more commonly in the young age group compared with those older than age 21.

Ownership of multiple guns was common; 66 percent of participants retained ownership of firearms other than the gun(s) exchanged. One additional gun was owned by 15 percent of respondents, two additional guns by 12 percent; 10 people had more than 20 guns, and one person reported owning 42 additional guns. Exchange of the sole firearm owned was more common among women (66 percent versus 37 percent for men, P <0.001).

Multiple reasons for participation in the exchange were listed by many respondents, and the reasons

listed varied significantly by age group and sex. The majority of respondents (73 percent) listed "safe way to get rid of a gun they no longer wanted" as one reason. Women were more likely to choose safe disposal than men (83 percent versus 70 percent, P <0.01). A significant trend was noted with younger age groups listing "I needed the money" more commonly than the older age groups (chi-square test for linear trend, statistic 49.9, df 1, P <0.0000) and conversely, the desire to dispose of the firearm safely was more common with increasing age groups (chi square test for linear trend, statistic 15.3, df 1, P <0.0000). Overall, 104 respondents (21 percent) exchanged a gun out of fear "someone in my home might get hurt." Two young women disposed of handguns used in the suicide of a family member. Only 27 respondents (5 percent) exchanged their gun because it was "useless." Fifteen respondents (3 percent) commented that funds received from the SGBBP would be used to purchase another firearm or would be donated to the National Rifle Association.

Crimes. Analysis of the short-term effect of the SGBBP on the monthly average of firearm-related robberies, assaults, and homicides revealed no statistically significant change, comparing the 12 months before to the 6 months following the program (table 1). No significant differences in the frequency of these crimes were noted for total crimes or in the proportion of these crimes involving a firearm. The average number of homicides actually increased by 43 percent, from 3.7 to 5.3 per month, and firearm-related homicides increased 67 percent, from 2.1 to 3.5 per month, but these differences were not statistically significant.

Admissions to the trauma center. The average number of firearm-related admissions of Seattle residents to the trauma center decreased from 7.5 to 7.0 per month, primarily as a consequence of an 18-percent drop in assault-related firearm injuries (table 1). However, the differences in admission frequency were not statistically significant.

Firearm deaths (Medical Examiners' data). The average number of firearm-related deaths increased slightly, primarily due to an increase in homicides from 2.6 to 4.2 per month. However, these changes were not statistically significant (table 1).

Beliefs, expectations, and support. The random-digit dialing of 3,957 telephone numbers resulted in 1,000 completed interviews. A total of 2,302 numbers were businesses or unassigned, and residential status of

Table 1. Mean number of firearm events per month before and after the Seattle Gun Buy-Back Program

Data source and type of event	12 months before[1]	6 months after[1]	P value
Police department monthly crime reports:			
Assaults	1,134.7	1,044.5	0.09
Firearm-related	53.2	54.6	0.8
Robberies	227.9	212.3	0.27
Firearm-related	58.7	66.0	0.33
Homicides[2]	3.7	5.3	0.12
Firearm-related	2.1	3.5	0.17
Injury admissions to the trauma center (total)[3]	7.5	7.0	0.8
Assaults	6.1	5.0	0.5
Self-inflicted	0.9	1.2	0.6
Others[4]	0.5	0.8	0.6
Deaths caused by firearms			
(total)[5]	7.1	8.3	0.5
Homicides	2.6	4.2	0.3
Suicides	4.3	4.0	0.7
Accidental	0.08	0.17	0.6

[1] Before Sept. 1, 1991 to Aug. 31, 1992; after-Oct. 1, 1992 to Mar. 31, 1993.
[2] Excludes homicides resulting from police intervention.
[3] Persons with a Seattle address admitted to *trauma* center.
[4] Combines accidental and unspecified as manner of injury.
[5] King County Medical Examiners' cases including all firearm deaths except persons from outside the county transferred to the trauma center.

364 phone numbers were unknown. A total of 1,291 residences were called, and 214 occupants refused to complete the interview. Nine minors and 68 persons with a language barrier were excluded. We assumed that 20 percent of numbers with unknown residential status represented actual residences, resulting in an estimated response rate of 77.7 percent.

Firearms were reported present in 24 percent of the households during the preceding year; 17 percent of those interviewed said that they owned long guns, and 14 percent, that they owned handguns. There was no association of household handgun prevalence with age of the person interviewed or with household income. Males reported a higher prevalence of handgun (18 percent versus 10 percent, P <0.001) and long gun (24 percent versus 10 percent, P <0.001) ownership compared with female respondents. Only 34 subjects (3.4 percent) refused to answer the household firearm question.

The sample interviewed contained 21 people who reported donating money in support of the SGBBP and two persons who reported exchanging a firearm during the SGBBP.

Public awareness of the SGBBP was high. Eighty-six percent of the sample stated they had heard about the program. Awareness did not vary significantly by sex, age, or income. A belief that the SGBBP would "remove guns from the streets" was highest among the 18-24-year-old age group and lowest in the oldest

Table 2. Effect of handgun ownership status of 1,000 respondents regarding expectations and support for the Seattle Gun Buy-Back Program (SGBBP)

Telephone survey questions	Percent responding yes: Owned gun	Percent responding yes: Did not own gun	P value
Expect SGBBP to:			
Remove guns from streets of Seattle	55.9	75.3	<0.001
Decrease crimes connected with handguns	34.6	50.9	<0.001
Decrease firearm injuries	46.0	60.2	<0.005
Should public funds like tax dollars or money confiscated in drug crimes be used to support gun buy-back programs	60.7	69.7	0.085

(older than age 65) group, (73 percent versus 55 percent, P < 0.005). Thirteen percent of the sample were unsure about the effect of the SGBBP.

In general, women were more likely than men to believe that the SGBBP would decrease handgun crimes (46 percent versus 41 percent, P = 0.01) and decrease firearm injuries (54 percent versus 47 percent, P = 0.01). The belief that the SGBBP would decrease handgun crime or injuries did not vary significantly by age or income.

Sixty percent of those interviewed supported the use of public funds for gun buy-back programs. The use of public funds was endorsed by a greater proportion of women than men (62 percent versus 55 percent, P = 0.002) and by minors (18-21 years old) more often than the older people (66 percent versus 50 percent, P = 0.04). Handgun owners were less likely to believe that the SGBBP would "remove guns from the streets," decrease firearm injuries, and decrease handgun crimes (table 2). The majority of respondents supported public funding of gun buy-back programs, however, with similar levels of support in households with and without handguns.

Comments

The Seattle Gun Buy-Back Program arose from a community-wide response to concentrated violence involving handguns and the shooting of three Seattle young people. Challenged by gunfire in their own neighborhood, community members responded with a desire to remove guns from the streets of Seattle with the hope that further injuries or deaths might be prevented.

A surprising number of older citizens and women participated in the SGBBP, apparently exchanging guns that they no longer wanted. The overall proportion of guns exchanged by minors was approximately 5 percent. Ideally, all of the firearms collected would have been handguns that pose any risk to young people. Given the current firearm mortality statistics regarding homicides, suicides, and nonintentional firearm injuries among adolescents, it is apparent that the risk of firearm death for minors extends beyond that associated with personal ownership to include the ready availability of firearms through a variety of sources in the home and the community (9-11).

Based on our findings from the telephone interviews of Seattle households, 14 percent of households contain handguns, and thus the 1,700 handguns collected by the SGBBP represent less than 1 percent of handguns in Seattle homes. Even under the unlikely assumption that guns turned in during buy-back programs are as likely to be used in a crime as the guns not exchanged, the effect of removing 1 percent of guns from the community on rates of firearm crimes is negligible. In 1979, Cook found that a 10-percent reduction in the prevalence of firearm ownership was associated with a 4-percent reduction in the robbery murder rate (23).

The Seattle buy-back program failed to reduce significantly the frequency of firearm injuries, deaths, or crimes. The evaluation was incapable of detecting small changes in these rates, given the year-to-year and month-to-month variation. A much larger number of guns would need to be collected to impact on firearm morbidity and mortality.

These limitations notwithstanding, there are a number of public health implications in this evaluation. Support for this program was high even among gun owners. The opinion expressed by a majority of the Seattle households surveyed was one of support for a program that might lead to community risk reduction by voluntarily removing unwanted firearms. Most of the people surveyed believed public funds should be used to support gun buy-back programs.

Many guns were collected from women and older citizens who took advantage of the SGBBP to safely dispose of apparently unwanted weapons. These people are least likely to use a gun to commit a violent street crime, but removing the gun removes the threat of injury from the household (11). Gun buy-back programs open to the general public can be expected to collect a great many more firearms than just the weapons relinquished by targeted groups.

Communities need a formal, well publicized, safe means of disposing of guns, separate from re-sale and re-circulation. Although the logistics of safely collecting and disposing of so many firearms is complex

and costly, decreasing the overall prevalence of firearms may have indirect benefits. According to recent estimates, only one firearm of every six used in a crime was obtained legally, and theft from residences is an important source for guns used in felonies (24). Federal law prevents minors from legally purchasing handguns; therefore young people have few legal means of acquiring them. Further, many studies indicate that removal of firearms from the home would be expected to decrease the risk of suicide (9,25,26) and homicide (10,11,23).

Future buy-back programs specifically designed to remove guns possessed by minors would benefit by holding them after school, evenings, or weekends in places like community centers or youth clubs. Enlisting adolescents in the gun buy-back process, promoting alternatives to self-arming, and offering other types of incentives might encourage more youth to disarm.

Perhaps the most attractive aspect of a gun buy-back program is its voluntary nature. It avoids the arguments of the National Rifle Association and other gun proponents by offering an incentive to give up guns voluntarily. The funds available for the SGBBP were insufficient to meet the demand of the citizens willing to dispose of firearms. To decrease the Seattle handgun prevalence by 30 percent would require more than $1 million, an amount predicted to have a significant effect on firearm morbidity and mortality. Cost benefit and cost effectiveness studies need to be done to determine what is a publicly and politically acceptable level of success.

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