

## ORIGINAL ARTICLE

## Missing the target: a comparison of buyback and fatality related guns

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**Objectives:** To determine whether the firearms recovered in buyback programs in a large urban community are the types most closely associated with firearm fatalities in the same geographic area.**Methods:** The type, caliber, and manufacturer of 941 handguns recovered in Milwaukee County 1994-96 buyback programs were compared with 369 homicide related and 125 suicide related handguns used in Milwaukee during 1994-97.**Results:** Buyback handguns differed substantially from those used in homicide and suicide. One third of buyback handguns were semiautomatic pistols versus two thirds of homicide related handguns ( $p < 0.001$ ) and 40% of suicide related handguns ( $p = \text{NS}$ ). Over 75% of buyback handguns were small caliber compared with 24% of homicide and 32% of suicide handguns ( $p < 0.001$ ). The top two manufacturers of buyback handguns represented 30% of these guns but only 5% of fatality related handguns ( $p < 0.001$ ). Companies currently out of business manufactured 15% of buyback handguns versus 7% of fatality related handguns ( $p < 0.001$ ).**Conclusions:** Handguns recovered in buyback programs are not the types most commonly linked to firearm homicides and suicides. Although buyback programs may increase awareness of firearm violence, limited resources for firearm injury prevention may be better spent in other ways.

More than 100 gun buyback or exchange programs have been conducted in the United States.<sup>1</sup> Buyback programs (programs involving an exchange of guns for money, product vouchers, or other items) have been held in over 30 states.<sup>2,3</sup> A national buyback program, sponsored by the Department of Housing and Urban Development, was implemented in approximately 90 cities in late 1999 but was discontinued in July of 2000.<sup>4-6</sup>

The current study investigated whether the firearms recovered in buyback programs in a large urban community are the types most closely associated with firearm fatalities in that same geographic area. Limited comparisons of buyback firearms to homicide firearms have indicated some differences between these groups.<sup>1,7</sup> There have been no previous comparisons of buyback firearms to those used in firearm suicides, and there have been no detailed comparisons of manufacturers of buyback firearms to those used in homicides.

## METHODS

### Data sources

Buyback programs were conducted in Milwaukee County in 1994, 1995, and 1996 by the Police Department or the County Sheriff. A \$50 gift certificate was given in exchange for a firearm which was considered by the exchanger to be "workable". Information on firearms acquired in buyback programs was obtained from the Wisconsin State Crime Laboratory.

Information on characteristics of firearms used in Milwaukee County homicides and suicides between 1994-97 was obtained from the Firearm Injury Reporting System (FIRS).<sup>7,8</sup> Data from FIRS are compiled from three sources: medical examiners/coroners, local law enforcement agencies, and the Wisconsin State Crime Laboratory.<sup>9,10</sup>

### Firearms

The unit of analysis was the firearm. Only handguns were included in the analysis because the Milwaukee Police Department concentrated on obtaining handguns. Firearms used in homicide-suicide combination events were excluded

because they could not be classified as either homicide or suicide. Firearms used in justifiable homicides were also excluded. Handguns were classified as small caliber (.22, .25, .32), medium caliber (.357/.38, .380, 9 mm), or large caliber (.40, .44, .45).

### Data analysis

The analyses were performed with the SAS statistical package (SAS Institute Inc, Cary, NC);  $\chi^2$  tests were used for all comparisons.

## RESULTS

During 1994-97, there were 407 firearm homicides and 190 firearm suicides in Milwaukee County. Nine firearm homicide-suicide events (involving 11 homicide and nine suicide victims) and seven justifiable homicides were excluded, leaving 389 firearm homicides and 181 firearm suicides for analysis. Handguns made up 95% (369) of the homicide firearms and 69% (125) of the suicide firearms.

Of the 1188 guns recovered in the buyback programs, 941 were handguns. One third of handguns were semiautomatic pistols, and two thirds were revolvers (handguns with rotating cylinders) (table 1). In contrast, among handguns of known type used in homicides, the proportions were reversed: 68% semiautomatic pistols and 32% revolvers ( $p < 0.001$  for comparison to buyback). Suicide firearms of known type did not differ significantly from buyback firearms (40% semiautomatic pistols, 60% revolvers,  $p = 0.07$ ).

Seventy eight percent of buyback handguns were small caliber, 20% were medium caliber, and 2% large caliber (table 1). Among homicide handguns, only 24% were small caliber, 64% were medium caliber, and 13% large caliber. Among suicide handguns, 32% were small caliber, 58% were medium caliber,

**Abbreviations:** ATF, Bureau of Alcohol, Tobacco, and Firearms; FIRS, Firearm Injury Reporting System

**Table 1** Characteristics of buyback handguns compared to handguns used in homicides and suicides; results are number (%)\*

	Buyback (n=941)	Homicides (n=369)	Suicides (n=125)
Type†			
Pistol	302 (32.1)	182 (67.7)	49 (40.2)
Revolver	639 (67.9)	87 (32.3)	73 (59.8)
Caliber‡			
Small	719 (78.1)	75 (23.7)	40 (32.0)
Medium	182 (19.8)	202 (63.7)	72 (57.6)
Large	20 (2.2)	40 (12.6)	13 (10.4)

\*Excluding 100 handguns of unknown type for homicide and three for suicide. Excluding 20 buyback handguns and 52 homicide handguns of unknown caliber. † $p < 0.001$  for pistols versus revolvers for buyback handguns compared with homicide handguns of known type.  $p = \text{NS}$  (0.07) for comparison of buyback to suicide handguns. ‡Small caliber: .22, .25, .32, medium caliber: .357/.38, .380, 9 mm, large caliber: .40, .44, .45.  $p < 0.001$  for distribution of small/medium/large caliber for buyback handguns versus handguns used in homicides and for buyback handguns versus handguns used in suicides.

and 10% large caliber. Both groups differed significantly from the buyback handguns ( $p < 0.001$ ).

Figure 1 shows the most common manufacturers for the three groups of handguns. The distribution of handguns among manufacturers differed very significantly for the buyback handguns compared both with those used in homicide and to those used in suicide ( $p < 0.001$  for both comparisons).

Over 21% ( $n = 22$ ) of the handguns used in homicides were manufactured by one of the seven companies in Southern California referred to as “Ring of Fire” companies (Raven, Phoenix, Lorcin, Davis, Jennings, Bryco, Sundance).<sup>11</sup> Only 9% of buyback handguns ( $n = 84$ ) were manufactured by these companies.

Harrington & Richardson manufactured 19% of the buyback handguns, and Iver Johnson manufactured 11% (fig 1). These two manufacturers together accounted for only 5% of handguns used in either homicides or suicides (12/227). Iver Johnson and RG Industries (the sixth most common manufacturer in buybacks) were both out of business over 10 years before the buyback programs. Lorcin Engineering (seven buyback handguns) is also out of business. These three com-

panies manufactured 15.1% of the buyback handguns but only 6.6% of handguns used in homicide or suicide.

## DISCUSSION

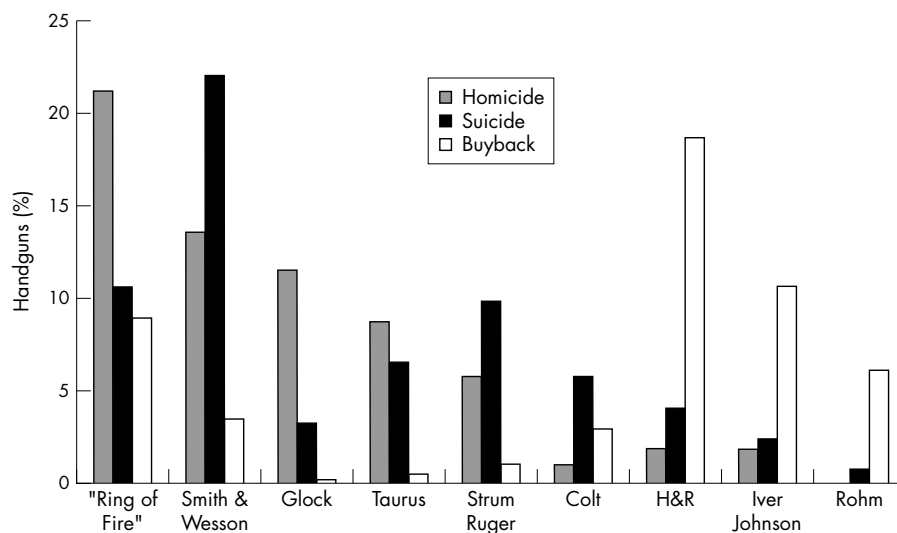
Characteristics of handguns recovered in Milwaukee buyback programs differed significantly from those most closely associated with homicides and suicides in Milwaukee. Other buyback programs have also found a high percentage of revolvers among recovered handguns: 65% in Sacramento,<sup>1</sup> 70% in Boston,<sup>7</sup> and 68% Washington, DC,<sup>12</sup> compared with 68% in the current study.

Buyback handguns differ from “crime guns” traced by the Bureau of Alcohol, Tobacco, and Firearms (ATF) (guns that are illegally possessed, used in a crime, or suspected to have been used in a crime).<sup>13</sup> In Milwaukee, 70% of handguns traced by the ATF in 1999 were semiautomatic pistols (80% for youths ages 18–24), compared with 32% for buyback guns.<sup>13</sup> In Sacramento, 57% of handguns confiscated by police were semiautomatic pistols compared to 35% of buyback handguns.<sup>1</sup> The firearm types recovered in Boston buybacks (17% semiautomatic pistols, 25% rifles) differed from youth crime guns (possessor age 21 or younger, 52% semiautomatic pistols, 9% rifles), but were more similar to adult crime guns (32% semiautomatic pistols, 22% rifles).<sup>7</sup>

Buyback guns also appear to be older than those used in crime. National ATF trace data show that over 15% of crime guns in 1999 had a time-to-crime (time between retail sale by a federal firearms licensee and the date recovered or requested for tracing by law enforcement) of one year or less, and approximately half were owned for five years or less.<sup>13</sup> In Boston, 72% of buyback guns were made before 1968, compared with 17% of youth crime guns and 22% of adult crime guns.<sup>7</sup> In Seattle, 67% of firearms recovered in a buyback were owned more than five years.<sup>14</sup> We found that two of the top six manufacturers of buyback handguns were out of business for over 10 years. These two manufacturers, which accounted for 14% of Milwaukee buyback guns, were also among the top six in the Washington, DC buybacks.<sup>12</sup>

As with homicide, there is evidence that the age of the gun is inversely associated with the risk that it will be used in a suicide. The highest risk of suicide has been found to be associated with newly purchased guns.<sup>10, 15, 16</sup>

We found significantly fewer buyback handguns manufactured by “Ring of Fire” companies compared with homicide



**Figure 1** Most common manufacturers for Milwaukee County buyback and fatality related handguns (manufacturers representing at least 5% of handguns for homicide, suicide, or buyback). “Ring of Fire”: Raven, Lorcin, Davis, Jennings, Phoenix, Bryco, Sundance;  $p < 0.001$  for the comparison of buyback handguns to homicide and to suicide handguns (the comparisons included a group representing all other known manufacturers). H&R, Harrington & Richardson.

handguns. These companies manufacture inexpensive handguns, which are disproportionately involved in fatalities and are among the most common crime guns traced by the ATF.<sup>8 11 13</sup>

Our study points out the importance of collecting detailed information on firearms involved in fatalities in order to evaluate the impact of policy initiatives and supports the current efforts at establishing a national violent death reporting system.<sup>17 18</sup>

### Limitations

No data were available on the characteristics of persons participating in the Milwaukee buybacks. In Sacramento, persons participating in the buyback program were older and had fewer risk factors for firearm homicide than those not participating.<sup>1</sup>

This study also did not measure the impact of buyback programs on reducing firearm injury or death. Several groups have compared homicide rates in their communities before and after gun buyback programs, and did not find an effect from the buyback programs.<sup>3 14</sup> Such an effect would be difficult to demonstrate given the large number of guns in circulation compared to the number recovered in buyback programs, estimated to be only 1%–2% of the guns in a community.<sup>19</sup>

There are no precise estimates of the risk of death per owned weapon per year. Such estimates would allow us to predict the reduction in fatalities associated with removal of buyback weapons. It has been estimated that 41% of the approximately 100 million US households owned guns in 1994.<sup>20 21</sup> In 1994, there were 38 505 firearm fatalities,<sup>22</sup> roughly one fatality/year per 1000 households with guns.

Urban areas differ from the US as a whole. In the city of Milwaukee, household gun ownership was estimated as 21% in 1994,<sup>23</sup> half the US percentage. The Milwaukee firearm fatality rate (21/100 000: FIRS unpublished data) was twice the US rate (11.4/100 000).<sup>22</sup> This leads to an estimate four times as high as the US estimate, or one fatality/year per 250 households with guns.

In Sacramento, 41% of survey respondents who participated in a gun buyback owned no gun after participating.<sup>1</sup> If the Milwaukee buybacks resulted in 487 households which no longer contained guns (41% of 1188 guns recovered from 1994–96), this would lead to an estimated reduction in deaths of 1–2/year. Thus the reduction in fatalities attributable to firearms recovered in a buyback program would be difficult to demonstrate in a particular community.

### IMPLICATIONS FOR PREVENTION

Our analysis indicates that the buyback programs in Milwaukee did not recover the kinds of firearms most likely to be involved in firearm homicides and suicides. These results suggest that these programs may not be effective in convincing the people at greatest risk of perpetrating such violence to turn in their firearms. It has been suggested that buyback programs might play a part in the prevention of firearm suicides or unintended firearm fatalities by reducing household risk factors.<sup>24</sup> Counseling by physicians to encourage patients to remove firearms from high risk households (such as those with elderly patients suffering from depression or dementia, or depressed adolescents) may also be effective.<sup>25–27</sup> Interventions which appear promising in reducing firearm homicide have recently been reviewed.<sup>28</sup> These include: police targeting of gun crime hot spots, aggressive prosecution of firearm related crimes, comprehensive crime gun tracing, investigation of gun dealers selling a disproportionate number of guns later used in crime, limiting gun purchases to one per month, and denying handgun purchase for persons convicted of violent or drug related misdemeanors. Gun buyback programs may increase public awareness of the problem of

### Key points

- Characteristics of handguns recovered in buyback programs are compared with those used in homicides and suicides in the same urban county.
- Two thirds of buyback handguns were revolvers; two thirds of homicide handguns were semiautomatic pistols.
- Three fourths of buyback handguns were small caliber. Homicide and suicide handguns were predominantly medium caliber.
- The profile of manufacturers represented among buyback handguns differed substantially from both homicide and suicide handguns.
- Buyback handguns were older and more likely to be made by companies out of business compared with homicide and with suicide handguns, and compared with handguns used in crime which have been traced by the ATF.
- In summary, the buyback programs did not recover the handguns most closely associated with homicide and suicide in the same community.

gun violence. However, limited resources for firearm injury prevention programs may be better spent in other ways.

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## LACUNAE .....

### Seen in St Andrews-by-the-Green Burial Ground, Glasgow

Jane Eliza Madden  
 Born 21, Nov 1859  
 Killed by being run over by an omnibus  
 19 Nov, 1871  
*All little Children that survey  
 The emblem'd Wheel that crush'd me down,  
 Be cautious as you careless play,  
 For shafts of death fly thick around.  
 Still rapid drives the car of time  
 Whose wheels some day shall crush us all.  
 The cold low bed which here is mine,  
 Shall somewhere be of great and small,  
 —Death is certain; the Hour unseen.*

### Cat gasses family

A family in the Italian town of Pinerolo is recovering from gas poisoning after their cat got caught in the home's heating system chimney and caused carbon monoxide to spread around the living room. Firefighters found the family cat roasted to death, stuck in the chimney (*The Age* (Melbourne), December 2001).

### Court case examines liability of administrators in "dangerous" sports

A Sydney court case concerning a football player paralysed in 1982 is examining aspects of the duty of care of administrators in sports. In 1982 the Sydney amateur rugby union player was hooker in the front row of a scrum, which collapsed leaving him paralysed. He is suing the NSW Rugby Union and his former club for unspecified millions of dollars, alleging that they knew the rules of the game exposed front row players forwards to unnecessary risk. The rules for scrums subsequently changed to protect front row players from neck and spinal injury. The plaintiff's lawyer has argued that if the laws had been in place at the time he would not have been injured. In a previous, similar case, two players injured in 1986 and 1987 had sued the International Rugby Board but had lost the case on the grounds that the board was too remote from the administration of the game in NSW and therefore had no duty of care to the players. The argument was made that danger is often part of the attraction for players, that the decision to participate was made freely, and that with autonomy came responsibility. The judge in the case has indicated that the issues raised in the case could be applied across all dangerous sports (*The Australian* (Sydney), February 2002).