

Missing Guns: Are the Canada Firearms Centre Estimates Off-Target?

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By comparing the number of fatal firearms accidents and suicides per 100,000 firearms in Canada and the United States this article finds that the rate of accidental shootings and suicides is considerably higher in Canada. The authors propose that these findings are a consequence of underreporting the true number of firearms in Canada. The findings suggest that the number of firearms in circulation in Canada is at least 10 million, about forty percent greater than estimated by the Canada Firearms Centre. Such findings have implications for evaluating the success of Bill C-68, legislation that made it mandatory to license all Canadian gun owners and register all firearms. G.L. Mays is a Professor in the Department of Criminal Justice at New Mexico State University. Rick Ruddell is an Assistant Professor in the Department of Political Science at California State University, Chico. This study was completed with the support of the Social Sciences and Humanities Research Council of Canada dissertation grant award 752-00-0357.

Criminologists, public policy analysts and advocates of the public health model of harm reduction have long debated the relationships between firearms and fatalities, whether these fatalities are the result of accidents, assaults or self-harm (Centerwall, 1991; Cook and Ludwig, 2000; Cukier, 1998; Lott, 1998; Polsby and Kates, 1998; Zimring and Hawkins, 1997). Within the United States and Canada, these political debates generally have focused on the balance between the merits of legislation and the restrictions to individual rights (Davis, 2000; Kopel, 1991; 1992; Mauser, 1998). An important starting point in these debates is estimating the number of firearms in circulation, or gun density, at different levels of analysis. Developing a reliable and valid indicator of the gun density is important to evaluate whether legislative interventions are necessary and whether they are successful to better understand the criminal misuse of firearms, and the relationships between firearms and morbidity or mortality (Cook and Ludwig, 1997; Dandurand, 1998). While there is widespread agreement concerning the importance of accurately establishing gun density, researchers have identified many limitations to different methods of estimating the true rate of firearms ownership and the gun density (Gabor, 1994; Kleck, 2001; Mauser, 2001; Stenning, 1994; 1996).

In particular scholars have questioned whether Canadian firearms legislation should be a model for gun control in the United States (Kopel, 1991; 1992; Ram, 1995). Bill C-68 recently has mandated that all Canadian firearms owners be licensed by January 1, 2001, and all firearms registered by January 1, 2003. Critics of these gun-control initiatives, however, have suggested that rates of non-compliance with the legislation already are very high (Breitkreuz, 2001a; Smithies, 2001). To better understand the degree of compliance with the legislation, however, we first need to understand how many firearms currently are owned in Canada.

Current estimates of the firearms in circulation in Canada range from 5 million (Angus Reid, 1991) to 21 million firearms (Canadian Institute for Legislative Action, 2000). The federal government's Canada Firearms Centre officially estimates the gun density of 7.4 million firearms, and approximately 1.2 million of these firearms are registered handguns (Canada Firearms Centre, 1998; Dandurand, 1998). The substantial variation between these estimates is troubling for researchers interested in evaluating the ongoing success of mandatory licensing and firearms registration.

This study compares suicide and accidental death data from Canada and the United States as a function of the number of fatalities per 100,000 firearms, rather than considering the more commonly used suicide or accidental death rate per 100,000 persons in the population. We contrast the Canadian data against statistics from the United States, as there is generally widespread agreement about the gun density in that nation (Brady Campaign, 2002; Canada Firearms Centre, 1998). Our strategy is to focus on what we do know, the number of firearms accidents and suicides in Canada and the United States, as well as the gun density in the United

States, and use these data to estimate the true gun density in Canada. By changing the focus from firearms fatalities in the population to the number of guns in circulation, we propose that our approximation of the number of firearms in Canada may be more accurate than those estimated by the Canada Firearms Centre.

I. GUN DENSITY—A CANADIAN PERSPECTIVE

The study of firearms density is fraught with methodological problems (Cook and Ludwig, 1997; Gabor, 1994; 1997; Kleck and Kovandzic, 2001; Mauser, 2001). There are definitional problems, for instance, about what constitutes a firearm. In January 2001 non-powder firearms in Canada, commonly called BB or pellet guns, officially became firearms if their muzzle velocity exceeded 500 feet per second (Canada Firearms Centre, 2001). As a result of this legislative change, the gun density in Canada increased overnight, although many persons do not consider pellet guns as actual firearms. Another consequence of this change is that owners of these pellet guns became criminals if they lacked a possession license. Despite these recent definitional changes and the fact that this change increased the number of officially defined firearms in circulation, this paper focuses on the density of powder firearms.¹

Another factor that influences the validity of gun density estimates is the fact that firearms have a long service life. Cartridge and black powder firearms sold over one hundred years ago, although antiquated, still are reasonably safe and functional if used with low velocity ammunition, which is commonly available. As a result, these antiques contribute to the existing stock of firearms. Unless they are destroyed, become inoperable, or are exported, these firearms will remain in circulation for generations, and they may have a similar capacity for lethality as their recently manufactured counterparts. Many of these antiquated firearms might not be in active use, and typically end up forgotten or hidden in closets, dresser drawers or hanging on basement walls.

An additional methodological problem is that researchers generally have relied upon self-report data from national surveys to estimate gun density in Canada (GPC Research, 2001; Mauser, 2001). These surveys frequently have found that the population reporting firearms ownership has ranged from a low of 17 percent of households to a high of 31 percent (GPC Research, 2001). Table 1 demonstrates the estimated prevalence of household firearms ownership with these different studies.

Table 1. Survey Research Estimating the Percentage of Canadian Households Reporting Firearms Ownership

Survey	Year	Sample Size	Households Reporting gun ownership
International Crime Survey	1989	2074	31.0
Mauser and Margolis	1990	393	30.0
Angus Reid	1991	10103	23.0
International Crime Survey	1992	2152	27.0
Pollara	1992	1100	33.0
Pollara	1993	1100	30.0
Pollara	1994	1200	30.0
Angus Reid	1994	1504	30.0
Mauser and Buckner	1995	1505	23.0
International Crime Survey	1996	2134	23.5
Environics	1997	2008	17.0
Angus Reid	1998	6819	21.0
GPC Research	2000	6145	17.0

Mean Percentage of Firearms Owning Households: 1989 to 1994 = 29.25

Mean Percentage of Firearms Owning Households: 1995 to 2000 = 20.30

Source: GPC Research, January, 2001 and Mauser, November 2001

One important finding from Table 1 is the rate of household gun ownership, or at least the rate of reported gun ownership, seems to be declining over time. The average gun prevalence declined from an average of 29.25 percent of households in the surveys conducted from 1989 to 1994, contrasted against the 20.30 percent of households in surveys conducted from 1995 to 2000. However, given the introduction of federal gun control initiatives, survey respondents may be reluctant to report firearms ownership accurately. By contrast, anecdotal evidence suggests that some Canadian firearms owners are abandoning their firearms due to the new requirements for licensing and registration, like they did during the national firearms amnesties of 1978 and 1992 (Hung, 2000). As relatively few firearms in Canada are ever surrendered to the police (Antonowicz, 1997, Breitzkreuz, 2002a), one may extrapolate that the stock of firearms is consolidating into fewer households, or owners, over time.

There are other methodological weaknesses about using survey instruments to solicit information about firearms ownership, regardless of the country under examination (Mauser and Kopel, 1992; Smithies, 2001). For instance, some individuals may not report firearms ownership accurately due to the perceived stigma associated with being a gun owner (Mauser and Kopel, 1992). In Canada, at least one percent of the respondents refused to answer questions about firearms ownership in one national poll (Angus Reid, 1991). Recently, three percent of the respondents in a national poll sponsored by the Canada Firearms Centre reported that they hunted or shot targets, but did not own a firearm (GPC Research, 2001). These types of responses may be indicative of underreported gun ownership. Finally, polls that do not accurately survey rural households, or regions of higher firearms ownership, may contribute to inaccurate estimates of the true gun density (Dandurand, 1998; Kopel, 1991; Mauser and Kopel, 1992).

A further limitation of survey research is the fact that female respondents are unlikely to report firearms ownership accurately. Mauser (2001) and Kleck (2001) both found that the married women are likely to underreport household firearms ownership in surveys. There are two possible reasons for this underreporting. First, these respondents may not be aware that there are firearms in the household. Second, for unknown reasons, these married female respondents may be less willing to self-declare firearms ownership than their spouses. This finding is important when one considers that urban females are most likely to be surveyed in typical media polls (Mauser and Kopel, 1992).

The Government of Canada has estimated that each household reporting firearms ownership represent 1.23 firearms owners (Canada Firearms Centre, 1998). With a total of 11.8 million households in Canada (GPC Research, 2001), 17 percent of all households would represent 2,467,380 firearms owners. With an estimated 7.4 million firearms in circulation, each of these gun owners in Canada would own approximately three firearms.

In addition to asking respondents directly about their firearms ownership, scholars also have evaluated alternative methods of measuring the firearms density. Kleck (2001) for instance, examined 18 different measures of firearms density at the city and state levels of analysis. These measures included tracking firearms offences, sales of gun magazines, NRA memberships, and the number of firearms dealers per capita at the city and state levels of analysis. Kleck (2001) found that the most valid predictor of gun ownership at the city level in the United States was the number of firearms suicides. Consistent with this approach we also examine firearms suicides in our comparative analysis of gun density.

Perhaps one of the most politically neutral methods of establishing the gun density is through examination of historical import and export data. Such data suggest that the 7.4 million firearms reported in Canada is a low estimate (Breitzkreuz, 2002). While there is an intuitive appeal to using these types of historical records, there are also methodological problems with this approach. Historically, rifles and shotguns in Canada were not subject to much regulation, and this may have resulted in underreporting. Import and export data also neglect the large number of firearms manufactured in Canada until the 1970s when they were first officially counted (Breitzkreuz, 2002). Additionally, some firearms have been lost, have become inoperable, or were deactivated over time. Other firearms are informally exported to other nations, such as the United States, without formal notification to either country (Cukier, 2001).

Furthermore, many firearms, especially handguns, have been illegally imported into Canada, usually from the United States (Axon and Moyer, 1994; Canada Firearms Centre, 1997; Dandurand, 1998). Veterans also have returned to Canada with war trophies, which were seldom declared. Finally, persons may construct rudimentary firearms easily with limited mechanical ability, although the low price and easy access to factory-

produced firearms would realistically limit this source of homemade weapons. Any of these factors would reduce the validity of such methods of estimating Canada's gun density through import and export data.

II. DATA AND METHODS

Different research methods have produced widely disparate estimates of the gun density in Canada. This Article contrasts suicide and accidental firearms fatality data from the United States to evaluate whether Canadian gun density data are accurate. Our approach is admittedly simplistic; however, we base our analyses on suicide and accidental death data, which are commonly collected in both nations, and have a high degree of reliability and validity (Centers for Disease Control and Prevention, 1997; Hung, 2001). These data are contrasted against the gun density estimates in both nations. While there is wide disagreement in the Canadian literature about the number of firearms in Canada (Canada Firearms Centre, 1998; Gabor, 1994; Mauser, 2001; Stenning, 1994; 1996) there tends to be considerable agreement about the number of firearms circulating in the United States, at least nationally (Brady Campaign, 2002; Cook and Ludwig, 1997).

Based on the estimates that are available, we argue that Canada should have a lower rate of firearms suicides and accidents than the United States. First, in Canada fewer guns are used for personal defense (Kopel, 1991; 1992) and most often against animal attacks (Mauser, 1996). Blackman (1984) found that approximately five percent of Canadians cited self-defense as the primary rationale for owning a firearm, compared to 25 percent of their counterparts in the United States. Cook and Ludwig (1997), for instance, used survey data to estimate that 14 million Americans carried firearms for personal defense in 1994. In fact, it is unlikely that a firearms possession or acquisition license would be granted to Canadians who reported that their firearms were intended for defense, and persons who have used firearms for personal defense in Canada are more likely to be held criminally responsible than their counterparts in the United States (Mauser, 1996). Personal defense firearms are more likely to be left loaded, carried concealed, and left unattended in the home or vehicle than firearms used for recreational purposes.

We propose that if the percentage of firearms left loaded and unsecured in the United States is higher, then the rate of firearms accidents is likely to be higher than they appear to be in Canada where owners are legally required to keep firearms unloaded and secured. Moreover, previous Canadian firearms legislation, such as Bill C-51, enacted in 1977, may have reduced access to firearms by unauthorized users. This legislation "grandfathered" fully automatic firearms to existing owners, placed restrictions on other military-style rifles and required all purchasers of firearms to produce Firearms Acquisition Certificates (FAC) issued by the police. Concurrent with this legislation, many provinces made it mandatory to successfully complete hunter safety training prior to being issued hunting licenses. As a result of these legislative changes in Canada, the access to firearms for untrained, mentally ill, or suicidal persons may be more difficult than in the United States, at least in the short-term. As Cukier (2001) correctly notes, however, the large number of firearms circulating in secondary markets in both nations make it likely that these persons could obtain firearms over the long-term.

Again, we can infer that these legislative requirements, over a period of two decades, would reduce the likelihood of accidental or suicide fatalities in Canada. This seems especially likely when contrasted against the United States, where federal legislation to screen purchases from firearms dealers was enacted in 1994.

Annual national-level firearms mortality data were obtained from the U.S. Centers for Disease Control's Morbidity and Mortality Weekly Reports (MMWR). An examination of these data finds that accidental firearms fatalities have been decreasing over time, while firearms suicides have remained relatively stable over time (Cherry et al., 1998). Data from 1994 to 1997 were collected and averaged into a yearly total to reduce the influence of any unusual annual variation.

The MMWR data were contrasted against the Canada Firearms Centre's annual firearm mortality statistics (Hung, 2001). Firearms mortality data from 1994 to 1997 were collected and averaged into a yearly total to reduce the influence of any annual variation. Again, these statistics demonstrate that accidental firearms fatalities have decreased significantly over time in both nations. The dates selected for this study were influenced by data availability; more recent Canadian firearms mortality data were not available.

Studies of firearms fatalities traditionally have compared the fatality rate per 100,000 persons in the population. By contrast, we have chosen to examine the fatality rate per 100,000 firearms. As there is widespread agreement about the numbers of firearms circulating in the United States, we believe that this is a

valid indicator of the gun density. If the Canada Firearms Centre gun density information is also accurate, we hypothesized that the firearms fatalities in Canada, at least accidental deaths and suicides, would be similar to the rates in the United States.

Table 2 indicates that the accidental and suicide deaths, per 100,000 firearms in Canada, however, is significantly higher than the rate per 100,000 firearms in the United States when we consider a gun density of 7.4 million firearms. When we estimated the Canadian gun density using a total of ten million firearms, however, the Canadian and American rates converged.²

Table 2. Firearm Fatalities per 100,000 firearms in the United States (1995 -1998) and Canada (1994 -1997): Estimated Gun Density

Panel A: United States

U.S. average Number of Accidental Fatalities (1994-97) = 1174	U.S. average number of Suicides (1994-97) = 18,250.	U.S. average number of Homicides (1994-97) = 15,092
.536 accidental deaths per 100,000 guns Estimated 219 million guns	8.33 suicides per 100,000 guns Estimated 219 million guns	6.89 homicides per 100,000 guns Estimated 219 million guns

Estimate of 219 million firearms was developed from Cook and Ludwig (1997) data estimating 192 million firearms in 1994, and ATF (2001) sales data documenting an average of 4.5 million firearms sold in the US since 1994.

Panel B: Canada

Canada average number of Accidental Fatalities (1994-97)= 44.5	Canada average number of Suicides (1994-97) = 895	Canada average number of Homicides (1994-97) = 162
.601 accidental deaths per 100,000 guns Estimated 7.4 million guns	12.09 suicides per 100,000 guns Estimated 7.4 million guns	2.19 homicides per 100,000 guns Estimated 7.4 million guns
.445 accidental deaths per 100,000 guns Estimated 10 million guns	8.95 suicides per 100,000 guns Estimated 10 million guns	1.62 homicides per 100,000 guns Estimated 10 million guns

Estimate of 7.4 million firearms in Canada (Canada Firearms Centre, 1998).

There are a number of possible reasons for the finding that accidental and suicide firearms fatalities are higher in Canada than the United States. First, the officially reported measure of gun density in Canada, 7.4 million firearms, may be inaccurate and the number is closer to the alternative we have proposed of ten million firearms. A second plausible reason for a higher firearms fatality rate in Canada may be as a consequence of the fact that handguns are rarely encountered in Canada (Canada Firearms Centre, 1998; Dandurand, 1998) and these firearms have a reduced capacity for lethality compared with rifles or shotguns (Di Maio, 1999). Using a similar argument, some may suggest that emergency care in hospitals in the United States is more effective at enhancing survivability of gunshot wounds—especially when contrasted against the survivability of gunshot wounds in rural Canada, where access to a trauma center may be several hours away.

If the estimate of a total gun density of 7.4 million firearms in Canada is correct, then Canadian gun owners are more accident-prone and apt to use a firearm for suicide than their American counterparts. While a plausible alternative explanation, we discount this possibility based on the fact of the safety-oriented initiatives legislated in Bills C-51, C-17 and C-68. In addition, given the fact that fewer Canadians use their firearms for personal defense than in the United States (Blackman, 1984; Mauser, 1996), there are likely fewer loaded and unsecured firearms found in Canada.

III. DISCUSSION

The present study suggests that the gun density in Canada may be considerably greater than estimated by the Canada Firearms Centre. This finding tends to affirm studies that estimated the gun density in Canada is in excess of 10 million firearms (Breitkreuz, 2001). This finding has implications for Canadian justice policy as well as criminological research. First, the success of Bill C-68 rests on the assumption that there are 2.3 million firearms owners in Canada, of whom approximately 2.2 have complied with the legislation (Canada Firearms Centre, 2001a).

Certainly, a considerable number of Canadians may not be in compliance with the provisions of Bill C-68 and have not obtained firearm possession licenses. One organized group, the Law-Abiding Unregistered Firearms Association, actively is flouting disobedience to the legislation and members have refused to obtain possession licenses (Law-Abiding Unregistered Firearms Association, 2001). Political critics of the legislation also have found that First Nations populations almost universally are boycotting the licensing requirements (Breitkreuz, 2001a). This pattern of non-compliance parallels that of Australia, Britain and New Zealand after similar laws were enacted in those nations (Mauser and Buckner, 1997).

Gross underreporting of the true gun density has significant implications for a Canadian firearms control bureaucracy eager to demonstrate its effectiveness: By deliberately underestimating the number of firearms—and their owners—the Canada Firearms Centre can claim widespread compliance with Bill C-68. Unfortunately, we believe that the estimates of the gun density presented here are more accurate than the official government estimates.

By January 1, 2003, all firearms in Canada must be registered. The outcome of this exercise will be instructive for legislators and policy analysts in the United States. Canadians, more than U.S. citizens, tend to be more likely to comply with firearms legislation that favors the collective rather than the individual (Davis, 2000; Kopel, 1991, 1992; Mauser, 1998).

Mandatory licensing and firearms registration are expensive programs. With approximately one-tenth the population of the United States, the government of Canada has spent some \$700 million dollars on implementation of this legislation (House of Commons Standing Committee on Justice and Human Rights, 2002) and critics have suggested that this money would be better invested in other crime-control strategies (Gunter, 2002).

IV. CONCLUSION

The number of firearms in circulation in a country has implications for several cultural features, as well as policy and practical impacts. Any policy aimed at restricting firearms ownership and use needs to be evaluated in order to determine what licensing, registration, control, and enforcement mechanisms are worth the money they cost. If not, more efficacious measures should be developed and implemented.

However, in order to evaluate any policy, an accurate base estimate of the number of firearms available must be included in the calculations. In the United States, a nation of pervasive firearms ownership, the estimates of firearms prevalence are reasonably agreed upon within certain ranges. In Canada, the Canada Firearms Centre provides the “official” estimates of firearms prevalence. If these official estimates are accurate, then Canadian firearms accidents and suicides per 100,000 firearms in circulation are substantially above those of the United States. By contrast, if firearms prevalence in Canada is significantly underestimated officially, then the accidental shooting and suicide rates of the two nations are very similar.

NOTES

1. Despite the fact that we have not considered non-powder firearms in our analysis, a number of scholars have identified the risks that these firearms pose for serious injury (American Academy of Pediatrics, 1987) and death (Lawrence, 1990).

2. Similar analyses were conducted using Australian and British statistics, using official accidental death data and estimated firearms density. We found that Canada’s rate of accidental death was higher per 100,000

firearms than any of these other nations. Unlike the United States there are no generally agreed upon rates of firearms density in these nations, however, so this finding is only tentative.

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