



## The impact of gun control (Bill C-51) on homicide in Canada

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### Abstract

Homicide is a multiply determined behavior, and single-factor prevention efforts have rarely been shown to have an impact on the homicide rate. Gun control has been proposed as an important component of society's response, and an opportunity for studying the effects of legislative gun control laws on homicide rates was provided by Canada's Criminal Law Amendment Act of 1977 (Bill C-51). This article reviews previous studies of the impact of this Act on the total population of Canada and subpopulations by age and sex and, in addition, presents the results of a multiple regression analysis, which controls for some social variables. It appears that Bill C-51 may have had an impact on homicide rates, at least for older victims. © 2001 Elsevier Science Ltd. All rights reserved.

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### Introduction

Homicide is an event with biological, psychological, interpersonal, social, and cultural elements (Allen, 1980; Lunde, 1975; Malmquist, 1996). The complexity of the event calls for a diverse set of strategies for prevention, and gun control has been proposed as one possible strategy (Miller & Hemenway, 1999).

Early research on the effects of stricter gun control laws on homicide in the United States was inconsistent, with some studies reporting a preventive effect (e.g., Giesel, Roll, & Wettick, 1969), while others did not (e.g., Murray, 1975).<sup>1</sup>

Methodologically, there have been three main designs for studying the impact of guns on homi-

cide: (1) ecological correlations between gun availability and homicide rates, (2) studies of the impact of having guns in the home on their use for homicide, and (3) changes in homicide rate as a result of gun legislation. Correlational studies over regions, the most common type of analysis, examine the association between two (or more) variables, but they are limited in that they do not establish causality. There have been a number of previous studies showing an association between availability of firearms in a society and the incidence of homicide (Killias, 1993; Lester, 1988). There have also been studies examining the association between actual gun ownership (such as the presence of guns in the home) and their use for lethal violence (Brent et al., 1993).

Time-series studies of the impact of gun legislation on homicide rates examined the changes in homicide rates over time, before and after gun legislation was introduced. There have been several studies using time-series approaches on the impact of gun

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measures: for example, the impact of gun control legislation in Massachusetts (Deutsch & Alt, 1977), the licensing of handguns in Washington, DC (Loftin, McDowall, Wiersema, & Cottey, 1991), a mandatory sentencing law in New Jersey (Fife & Abrams, 1989), and gun control legislation in Denmark (Thomsen & Albrecksten, 1991).

Stack (1998), in his review of gun control studies, pointed out that rarely do these time-series studies take into account other societal factors that may influence the homicide rate, factors such as poverty, unemployment, and the age structure of the population. He argued that this was a neglected area of study and that multivariate models that examine the relationship between rates of lethal violence and gun legislation, taking into account other demographic, social, and economic factors, were critical in studies of the impact of gun control legislation. Canada's Department of Justice (1996) has also called for such multivariate analyses.

In the United States, where most research on the impact of gun control on homicide has been conducted, gun control has been controversial (Cramer, 1995; Kenneth & Anderson, 1975). The situation is quite different in Canada (Leenaars, 1995; Lipset, 1992), and Canada has a long history of gun legislation (Department of Justice, 1996).

### Studies in Canada

First, a review of the previous Canadian research will be presented, regarding the question "Did gun control in Canada impact on homicide rates as a result of Canada's Criminal Law Amendment Act of 1977 (Bill C-51), enforced from 1978 on?" This Act required acquisition certificates for all firearms, restricted the availability of some types of firearms to certain types of individuals, set up procedures for handling and storing firearms, required permits for

Table 1  
Homicide rates in Canada before and after passage of C-51 in 1977

Year	Homicide rate			Percentage of homicides by firearms
	Total	Firearms	Other methods	
1969	1.79	0.74	1.04	41.6
1970	1.98	0.86	1.11	43.7
1971	2.12	0.88	1.24	41.5
1972	2.32	0.93	1.39	40.2
1973	2.40	0.97	1.43	40.8
1974	2.43	1.20	1.23	49.5
1975	2.66	1.16	1.50	43.5
1976	2.42	0.96	1.46	39.6
Mean	2.26	0.96	1.30	42.5
S.D.	0.28	0.15	0.17	3.2
<i>b</i>	0.10**	0.05*	0.06**	0.11
1977	2.57	0.98	1.58	38.4
1978	2.43	0.98	1.45	40.2
1979	2.46	0.79	1.67	32.2
1980	2.07	0.78	1.29	37.8
1981	2.30	0.75	1.55	32.7
1982	2.42	0.86	1.56	35.7
1983	2.38	0.80	1.58	33.6
1984	2.31	0.86	1.45	37.3
1985	2.12	0.71	1.41	33.3
Mean	2.31	0.82	1.49	35.3
S.D.	0.15	0.08	0.12	2.9
<i>b</i>	-0.02	-0.02	-0.01	-0.39
<i>t</i> <sub>14</sub>	0.41	2.38*	2.66**	4.79**

\*  $P < .05$ .

\*\*  $P < .01$ .

those selling firearms, and increased the sentences for firearm offences.

Sproule and Kenneth (1988) documented the use of firearms for homicide in Canada, and suggested that gun control may be a means to prevent homicide.<sup>2</sup> Early commentators on the impact of Bill C-51 (Mundt, 1990), however, noted that Bill C-51 had little perceptible impact on homicides, suicides, or accidental deaths, but Mundt (1990) provided only a few charts and numbers and carried out no tests of statistical significance.<sup>3</sup>

Leenaars and Lester (1994) examined the impact of Bill C-51 on Canadian rates of homicide, comparing the period 1969–1976 with the period 1978–1985 to see whether the bill was associated with changes in the homicide rate. The results are shown in Table 1. Whereas the total homicide rate in Canada for the periods 1969–1976 and 1978–1985 did not differ significantly, the homicide rate by firearm decreased significantly after passage of Bill C-51, as did the percentage of homicides involving a firearm. The homicide rate by all other methods, however, increased after passage of Bill C-51.

These results indicate, therefore, that the passage of Bill C-51, which strengthened controls on firearms in Canada, was associated with a reduced rate in use of firearms for homicide, but there was evidence that individuals intent on murder may have switched to other means for murder since the rate using all other methods for homicide increased, leaving the total homicide rate unchanged. This phenomenon is called “displacement” by criminologists, and limits efforts to prevent lethal violence by restricting access to lethal methods (Lester, 1993).

Rich et al. (1990) have suggested that, even if overall populations show no significant change in mortality rates after legislation, there may still be significant effects in subpopulations. For example, Lester (1984) suggested that the impact of gun control legislation may differ for people of different ages and for men versus women.

Leenaars and Lester (1997) examined the differential impact of gun control on victims of different ages and found that the passage of Bill C-51 appeared to have a different impact depending on the age of the victim. The effects of the passage of

Table 2  
Changes in homicide rates from 1969–1976 to 1978–1985 by age of victim

Age	Homicide rate			Percentage of homicides by firearms
	Total	Firearms	Other methods	
<i>15–24</i>				
1969–1976: mean	2.72	1.32	1.40	48.2
1978–1985: mean	2.63	1.00*	1.64*	37.8*
<i>25–34</i>				
1969–1976: mean	3.52	1.92	1.60	54.4
1978–1985: mean	3.45	1.47***	3.84***	42.8***
<i>35–44</i>				
1969–1976: mean	3.23	1.51	1.72	47.2
1978–1985: mean	3.09	1.28	1.81	41.0*
<i>45–54</i>				
1969–1976: mean	2.76	1.05	1.70	38.2
1978–1985: mean	2.66	0.84*	1.82	31.4*
<i>55–64</i>				
1969–1976: mean	2.33	0.81	1.52	34.9
1978–1985: mean	2.01*	0.61*	1.40	30.3
<i>65–74</i>				
1969–1976: mean	1.83	0.54	1.29	29.1
1978–1985: mean	1.64	0.34*	1.29	21.0*
<i>75+</i>				
1969–1976: mean	2.00	0.41	1.59	18.0
1978–1985: mean	1.73	0.27	1.46	15.3

\* Significantly different from the 1969–1976 mean  $P < .05$ .

\*\*\* Significantly different from the 1969–1976 mean  $P < .001$ .

Bill C-51 as a function of the age of the victim are shown in Table 2. Table 3 shows the linear trends for the two periods, 1969–1976 and 1978–1985 — the regression coefficients (*b* coefficients) for simple regressions over time.

The results in Table 2 indicate that the firearm homicide rates for victims aged fifteen to twenty-four, twenty-five to thirty-four, forty-five to fifty-four, fifty-five to sixty-four, and sixty-five to seventy-four decreased significantly after the passage of C-51. There was an increase in the homicide rates by all other methods for victims aged fifteen to twenty-four and twenty-five to thirty-four. Thus, while displacement occurred for young adult victims, it did not for old adult victims. The percentage of homicides by firearms decreased for all age groups, significantly for five of the seven age groups. The linear regression results for 1978–1985 Table 3, however, showed no continuing declines in the use of firearms for homicide in the period 1978–1985 except for victims seventy-five years of age and older.

Leenaars and Lester (1996) examined whether Bill C-51 had different effects for male and female

victims. For male victims (see Table 4), the passage of Bill C-51 led to less use of firearms for homicide and a greater use for all other methods. The use of firearms for male victims, however, stopped increasing after 1978 (as seen from the nonsignificant regression coefficients). For female victims, the firearm homicide rates decreased after passage of Bill C-51, with no evidence of switching to other methods for homicide. Furthermore, the percentage of women killed with firearms declined after the passage of Bill C-51. Thus, in summary, the passage of Bill C-51 seemed to have had a more beneficial impact for female victims than for male victims.

The results of the age and sex studies are interesting because, since the data are victim-based, gun control has generally been deemed most essential, from a criminal justice perspective, for the most hardened targets, that is, younger people and males, not the most vulnerable (females and the elderly). Yet, these data show that homicide rates declined most among the most vulnerable, that is, older victims and female victims.

Table 3  
Linear trends in homicide rates from 1969–1976 to 1978–1985 by age of victim (*b* coefficients shown)

Age	Homicide rate			Percentage of homicides by firearms
	Total	Firearms	Other methods	
<i>15–24</i>				
1969–1976: mean	0.15	0.10	0.05	1.05
1978–1985: mean	–0.04	–0.04	–0.03	–0.80
<i>25–34</i>				
1969–1976: mean	0.09	0.05	0.04	–0.13
1978–1985: mean	0.05	0.01	0.05	–0.57
<i>35–44</i>				
1969–1976: mean	0.12*	0.04	0.08	–0.54
1978–1985: mean	–0.12	–0.09	–0.03	–1.26
<i>45–54</i>				
1969–1976: mean	0.14	0.02	0.12**	–1.02
1978–1985: mean	–0.04	–0.01	–0.03	0.32
<i>55–64</i>				
1969–1976: mean	0.12*	0.03	0.09*	–0.35
1978–1985: mean	–0.03	–0.01	–0.02	–0.41
<i>65–74</i>				
1969–1976: mean	–0.02	–0.04	0.02	–1.97
1978–1985: mean	–0.12*	–0.02	–0.09	–0.04
<i>75+</i>				
1969–1976: mean	0.16	0.07	0.09	1.83
1978–1985: mean	0.10	0.04**	0.06	1.80*

\*  $P < .05$ .

\*\*  $P < .01$ .

Table 4

Homicide rates in Canada before and after passage of Bill C-51 in 1977, by sex of victim

Year	Homicide rate			Percentage of homicides by firearms
	Total	Firearms	Other methods	
<i>Males</i>				
1969	2.42	1.10	1.32	45.6
1970	2.45	1.24	1.21	50.6
1971	2.77	1.20	1.57	43.5
1972	2.94	1.30	1.64	44.2
1973	3.09	1.35	1.74	43.8
1974	3.06	1.68	1.38	55.0
1975	3.53	1.63	1.90	46.1
1976	3.21	1.40	1.81	43.6
Mean	2.93	1.36	1.57	46.55
S.D.	0.38	0.20	0.25	4.14
<i>b</i>	0.14**	0.07*	0.08*	– 0.03
1977	3.45	1.45	2.00	42.1
1978	3.33	1.43	1.90	42.9
1979	3.20	1.14	2.06	35.5
1980	2.78	1.12	1.66	40.2
1981	2.87	1.04	1.83	36.4
1982	3.26	1.22	2.04	37.4
1983	3.12	1.13	1.99	36.2
1984	3.18	1.31	1.87	41.2
1985	2.71	1.00	1.71	36.8
Mean	3.06	1.17	1.88	38.32
S.D.	0.24	0.14	0.15	2.73
<i>b</i>	– 0.04	– 0.02	– 0.01	– 0.30
<i>t</i> <sub>14</sub>	0.78	2.16*	3.06**	4.69**
<i>Females</i>				
1969	1.15	0.38	0.77	33.3
1970	1.50	0.49	1.01	32.5
1971	1.48	0.56	0.92	37.7
1972	1.69	0.56	1.13	33.2
1973	1.71	0.58	1.13	33.9
1974	1.79	0.72	1.07	40.3
1975	1.80	0.69	1.11	38.5
1976	1.64	0.52	1.12	31.7
Mean	1.59	0.56	1.03	35.14
S.D.	0.22	0.11	0.13	3.21
<i>b</i>	0.07*	0.03	0.04*	0.32
1977	1.69	0.52	1.17	30.8
1978	1.53	0.53	1.00	34.3
1979	1.73	0.45	1.28	26.2
1980	1.36	0.45	0.91	32.9
1981	1.74	0.46	1.28	26.6
1982	1.56	0.51	1.05	33.0
1983	1.65	0.48	1.17	29.0
1984	1.45	0.42	1.03	28.8
1985	1.54	0.42	1.12	27.4
Mean	1.57	0.46	1.10	29.77
S.D.	0.1	0.04	0.13	3.18
<i>b</i>	– 0.01	– 0.01	0.01	– 0.48
<i>t</i> <sub>14</sub>	0.28	2.40*	1.11	3.36**

\*  $P < .05$ .\*\*  $P < .01$ .

The aims of the present study were to take into account Stack's (1998) criticisms of the neglect of multivariate designs in these studies. Would the effects of the passage of Bill C-51 on the use of firearms for homicide still be found if other social variables were taken into account?

## Method

In order to see whether other social changes might have had an impact on homicide rates from guns (Statistics Canada (annual)), time-series regressions were run for the period 1969–1985. The social indicators used were birth, marriage, and divorce rates as measures of domestic integration, the unemployment rate, the median family income, and the percentage of the males aged fifteen to twenty-four years as a percentage of the total male population (the

group with the highest crime rates). The year was coded as 0 for those years prior to the Bill C-51 and 1 for those years after its implementation. The data were purchased from Statistics Canada.

The time-series regressions were run with a statistical package from Doan (1990), using the Cochrane–Orcutt technique to correct for the serial autocorrelation in the data.

## Results

The results are shown in Table 5. It can be seen that the passage of Bill C-51 was associated with a decline in the overall homicide rate (which reached statistical significance), a nonsignificant decline in the firearms homicide rate, no increase in the homicide rate by all other methods, and a nonsignificant reduction in the percentage of homicides committed

Table 5  
Multivariate trends in homicide rates for 1969–1985 (*b* coefficients shown)

	Rate: total	Rate: firearm	Rate: other methods	Percentage by firearm
<i>Total</i>				
Constant	5.29	−0.01	−1.31	155.87
Bill C-51	−0.35**	−0.16	−0.01	−6.88
Percentage of young males	19.29**	3.42	12.43**	−25.17
Birth rate	−0.29	−0.07	−0.07	−2.92
Marriage rate	−0.05	0.19	0.10	−2.40
Divorce rate	0.19	0.19	−0.04	5.19
Unemployment	0.03	0.02	0.07*	−1.49
Median family income	−0.04	−0.01	0.01	−0.83
<i>R</i> <sup>2</sup>	.81	.68	.86	.68
<i>Males</i>				
Constant	2.81	0.36	−4.48	267.77
Bill C-51	−0.52**	−0.32	−0.02	−9.61*
Percentage of young males	33.29**	7.64	21.62**	−51.69
Birth rate	−0.30	−0.10	−0.04	−4.53
Marriage rate	−0.05	0.15	0.15	−8.02
Divorce rate	0.02	0.18	−0.18	6.19
Unemployment	0.11	0.03	0.14**	−2.76
Median family income	−0.03	−0.01	0.01	−1.27
<i>R</i> <sup>2</sup>	.82	.62	.90	.71
<i>Females</i>				
Constant	2.44	0.61	1.37	−37.27
Bill C-51	−0.11	−0.07	−0.01	−1.49
Percentage of young males	3.36	0.22	2.61	−20.32
Birth rate	−0.17	−0.06	−0.08	0.11
Marriage rate	0.20	0.15	0.06	8.13
Divorce rate	0.25*	0.19	0.05	6.15
Unemployment	0.01	−0.01	0.01	0.51
Median family income	−0.02	−0.01	−0.01	−0.23
<i>R</i> <sup>2</sup>	.83	.74	.83	.66

\*  $P < .10$ .

\*\*  $P < .05$  or better.

by guns. The results were similar for male victims of homicide. The results were, however, different for female victims of homicide, with only divorce rates significantly associated with the total homicide rate.

## Discussion

The passage of Bill C-51 in Canada in 1977, introducing stricter gun control, appears to have been followed by a significant reduction in the homicide rate, even after controlling for some social variables (such as unemployment rates and the proportion of young males in the population).

There may, of course, have been social changes other than those considered here that might be responsible for changes in the homicide rates, and the use of a different set of social indicators (such as drug use) might change the estimates of the impact of the passage of Bill C-51. Time-series data on such indicators, however, are not presently available. For example, alcohol and drug consumption data in Canada have only been available since 1985 (E. Simoneti, Statistics Canada, personal communication, August 19, 1999). Canada's Department of Justice (1996) also isolated a few other social variables that may be associated with homicide, i.e., foreign borns and education levels. Data on foreign borns, however, are only gathered every five years and the data on education levels do not lend themselves to similar analysis as the other data available.

It would also be useful to explore the impact of Bill C-51 on murder rates broken down by offender characteristics. Did Bill C-51 have an impact on murders committed by males versus females, and by fifteen- to twenty-four-year-olds versus those of other ages? Unfortunately, not all murders are solved, and data on offenders by sex and age for the murders committed in each year are not available. Again, this is a possibility for future research.

While controlling access to lethal means for murder has been proposed as a sound tactic for preventing homicide (e.g., Lester, 1984), others strongly disagree (e.g., Kleck, 1991). This study on the impact of gun control legislation in Canada suggested that controlling access to lethal means for murder might be an effective tactic for older victims, a vulnerable target. It was also concluded that gun legislation appeared to have an impact on homicide rates in Canada even after some social variables were taken into account.

More research is needed to strengthen the conclusion that the passage of the gun control law in Canada had a significant impact on homicide. For example, since Bill C-51 involved both additional

regulations and additional punishments, it might be worthwhile in the future to address the question of which part of the bill may have been effective and why. It may be concluded, however, that this study showed a positive impact of gun control on homicide, albeit not uniformly across all potential victims of homicide. Recently, in 1995, further gun control legislation was passed in Canada (Bill C-68). It would be of interest to explore the impact of this legislation to see whether the effects were similar to those reported for Bill C-51 passed in 1977.

## Notes

1. For suicide in Canada, Sloan, Rivara, Reay, Feris, and Kellerman (1990) showed that the use of handguns for suicide was lower in Vancouver as compared to Seattle, but the use of other methods for suicide was higher. Thus, switching appeared to have occurred, except for the suicides of those aged fifteen to twenty-four. Carrington and Moyer (1994a) found that provinces in Canada with higher levels of gun ownership also had higher rates of firearm suicide, but no different rates of suicide by all other methods. Simon, Chouinard, and Gravel (1996) found that the number of hunting licenses per capita in the regions of Quebec was associated with the use of firearms for suicide.

2. Two unpublished papers on the impact of gun control in Canada were presented at conferences (Blackman, 1984; Mauser & Holmes, 1991) but, since they were not published, were not subject to peer review, and they were not available for perusal.

3. For suicide, Carrington and Moyer (1994b) found that the firearms suicide rate decreased after the passage of Bill C-51, but the suicide rate by all other methods did not change. Thus, switching did not occur. In Toronto, Rich, Young, Fowler, Wagner, and Black (1990) found that as firearm suicides decreased, use of subway trains for suicide increased.

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