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Bill 64: Firearms Registration Act

BRIEF SUBMITTED TO THE COMMITTEE ON INSTITUTIONS

Québec

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Direction du développement des individus et des communautés

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Foreword

The Institut national de santé publique du Québec (INSPQ) [Québec's public health institute] is a public health expertise and reference centre in Québec. Its mission is to support Québec's Ministre de la Santé et des Services sociaux [Minister of Health and Social Services], regional public health authorities and health and social services institutions in carrying out their public health responsibilities, by offering them its expertise and specialized laboratory and screening services. As part of its mission, it must inform the Minister of the impact of public policies on the health of the population of Québec based on the best available data.

This brief, which was tabled during the special consultations and public hearings on Bill 64, the *Firearms Registration Act*, seeks to fulfil this mission. It provides scientific insight into the health and safety issues that affect Québecers in relation to access to firearms.

The INSPQ has been concerned for many years about the risk of firearm-related injuries and deaths. In 2010, it expressed its views on federal Bill C-391, the *Act to amend the Criminal Code and the Firearms Act* by submitting a brief to the House of Commons Standing Committee on Public Safety and National Security. The present document repeats most of the arguments presented in that brief. However, it is based on an updated literature review, the most recent data for Québec and new statistical analyses.

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Highlights

The issues related to access to firearms go well beyond the use of these weapons in criminal activities. Access to firearms is an important risk factor for suicide, homicide, particularly spousal homicide, and accidental death.

Most firearm-related deaths are not linked to criminal activities and involve long guns

- Between 2009 and 2013, an average of 127 people died in Québec annually due to firearm-related suicide. This is 5 times the number of victims of firearm-related homicide.
- Suicide is the leading cause of firearm-related deaths in Québec. In most cases, the suicides are committed in the victim's home using a long gun.
- Most victims of firearm-related deaths are male, except in intrafamilial homicides.
- Firearm-related deaths occur throughout Québec, but the risk of firearm-related suicide is higher in rural areas than in urban or peri-urban ones.

The scientific literature shows that the presence of firearms in the home is a risk factor for death

- The presence of a firearm in the home is associated with an increase in the risk of suicide, homicide and accidental death among the members of the household.
- A large proportion of suicide attempts are not planned long in advance. In half of cases, the suicidal crisis is short-lived, i.e., less than 10 minutes.
- Access to firearms is a "facilitating" factor for suicide. The mere presence of a firearm in the home significantly increases the risk of suicide. Firearms are the most lethal method used in suicide attempts.
- The presence of a firearm in the home increases the risk of spousal homicide, as well as the severity and lethality of the spousal violence involved.

Controlling access to firearms in the home protects people and prevents deaths

- Most firearm-related deaths occur in the home. Making homes safe by controlling access to firearms can prevent such deaths.
- Safe storage practices make firearms less accessible to individuals likely to misuse them.
- Preventing suicidal individuals from gaining access to a firearm during a suicidal crisis gives them an opportunity to get help once the crisis is over.
- Controlling access to firearms in situations involving spousal violence can prevent spousal homicides.

Legislation in the area of firearms control: effective measures

- Legislation that includes several control measures is effective in preventing firearm-related suicides and homicides. Canada's legislation falls into this category.
- Bill C-68, which introduced, among other things, the requirement for all firearm owners to hold a licence and to register non-restricted firearms, reduced the number of suicides and homicides in Canada.

- Between 1998 and 2012, Bill C-68 prevented an average of 72 firearm-related suicides per year In Québec, with no substitution effect.

The firearms possession and acquisition licence and the registration of non-restricted firearms: two necessary and complementary measures

- Requiring that all firearm owners hold a possession and acquisition licence and that they register non-restricted firearms are two necessary and complementary public safety measures.
- By making it possible to link each firearm to its owner, these two measures encourage owners to comply with the regulations in force and support the police in the performance of their duties to make life settings safe.

Bill 64: restoring the safety net

- Bill 64 reintroduces the requirement in Québec for all non-restricted firearms to be registered.
- The INSPQ is in favour of Bill 64 because it knows that most firearm-related deaths (suicides, intrafamilial homicides and accidental deaths) involve non-restricted firearms.
- The INSPQ recommends that the bill be amended to make it mandatory to verify a person's firearms possession and acquisition licence when he or she takes possession of a firearm or files a firearm registration application.

Introduction

Non-restricted firearms[1] are generally used in the context of sport, for hunting or target practice. Even though these activities are legal and have a place in society, access to firearms of this type has risks that cannot be ignored from a public health standpoint. Access to firearms is an important risk factor for suicide, homicide, particularly spousal homicide, and accidental death.

The issues related to access to firearms go well beyond the use of these weapons in criminal activities (e.g., criminal gang activities). Therefore, it is important to focus the debate on the means that modern societies can adopt in order to reduce the risk of injury and death by firearms, regardless of the circumstances and whether or not they are linked to criminal activities. Firearms control measures are one such means and they are essential to ensuring the safety of individuals, homes and neighbourhoods, while allowing firearms to be used lawfully for recreation or sport. It has been demonstrated that such measures save lives and, as stipulated by the Supreme Court of Canada (2000), licences to possess firearms and registration "… are integral and necessary to the operation of the scheme".

Therefore, the INSPQ welcomes Bill 64, which provides for the registration of non-restricted firearms in the territory of Québec. This measure offsets the elimination, in 2012, of the requirement to register non-restricted firearms in Canada.

In this brief, the INSPQ draws decision makers' attention to the public health and safety concerns that support the creation of a new registry for non-restricted firearms. The first section presents data on the number of firearm-related deaths in Québec. The second section concerns the importance of controlling access to firearms in the home in order to prevent firearm-related deaths. The third section looks at the effectiveness of legislative measures to control firearms. The fourth and final section examines the usefulness of registering non-restricted firearms and the necessary complementarity of this measure with the requirement to hold a licence to possess firearms.

[1] Most shoulder guns, such as rifles and shotguns, are non-restricted firearms. They are also called long guns in order to differentiate them from handguns, such as revolvers and pistols.

1 Most firearm-related deaths are not linked to criminal activities and involve long guns

From 2009 to 2013, 789 deaths in Québec were caused by firearms, including 634 suicides (80.4%), 139 homicides (17.6%), 11 accidental deaths (1.4%) and 5 deaths from undetermined causes (0.6%) (Table 1).

Suicides

Between 2009 and 2013, an average of 127 people per year committed suicide with a firearm. In 95.7% of the cases, the victims of firearm-related suicide were male (Table 1). The highest rates were observed among people aged 35 and over. In 77.1% of the cases, the suicide occurred in the victim's home, and in 81.7%, the weapon used was a long gun. The rate of firearm-related suicide was higher in rural areas (3.4 deaths per 100 000 person-years) than in urban or peri-urban ones (0.8 to 2.1 deaths per 100 000 person-years). Two percent of firearm-related suicides occurred in a context of intrafamilial violence (suicide committed following an intrafamilial homicide).

Homicides

Between 2009 and 2013, an average of 28 people per year were victims of firearm-related homicide. In 84.9% of the cases, the victims were male (Table 1). The highest rates were observed among 20- to 34-year-olds (0.7 per 100 000 person years) and 35 to 49 year olds (0.6 per 100 000 person-years). In 43.9% of the cases, the homicide was committed in the victim's home (36.4% of the cases when the victim was male and 85.7% when the victim was female) (data not presented). Handguns were used more often (43.2%) than long guns (22.3%); however, the type of firearm employed was not specified in one case out of three (34.5%). The rate of firearm-related homicide in rural areas (0.4 per 100 000 person-years) was comparable to that observed in the Montréal census metropolitan area (CMA) (0.5 per 100 000 person-years). Fourteen percent (14.4%) of firearm-related homicides were committed in a context of intrafamilial violence: most were perpetrated against females (65%), took place in the victim's home (85%) and involved a long gun (55%) (data not presented).

Accidental deaths

Between 2009 and 2013, all victims of accidental firearm-related deaths were male, and in 9 cases out of 10, they were 20 years of age or older. Slightly less than half of the deaths (45.5%) occurred in the home of the victim, and nearly three quarters (72.7%) involved a long gun. The same percentage of cases was observed in rural areas (36.4%) and the Montréal CMA (36.4%): the remainder of the cases were observed in other urban CMAs (27.3%) (data not presented).

Highlights

- Suicide is by far the leading cause of firearm-related deaths in Québec, and in most cases it is committed in the victim's home using a long gun.
- The majority of intrafamilial homicides and nearly half of accidental deaths occur in the victim's home, and in most cases the weapon involved is a long gun.
- Most victims of firearm-related deaths are male, except in intrafamilial homicides, where the victims are largely female.
- Firearm-related deaths occur throughout Québec, but the risk of firearm-related suicide is higher in rural areas than in urban or peri-urban ones.

Table 1 Number and rate of firearm-related suicides and homicides according to certain characteristics of the victims, place of occurrence and type of firearm used: both genders, Québec as a whole, 2009 to 2013

Characteristics		Suicides				Homicides			
		Number[1]	%	Rate[2]	CI[3] 95%	Number[1]	%	Rate[2]	CI[3] 95 %
Age (years)	0-14	3	0.5	0.0	(0.0-0.1)	1	0.7	0.0	(0.0-0.1)
	15-19	22	3.5	0.9	(0.6-1.4)	3	2.2	0.1	(0.0-0.4)
	20-34	94	14.8	1.2	(1.0-1.5)	51	36.7	0.7	(0.5-0.9)
	35-49	163	25.7	2.0	(1.7-2.3)	53	38.1	0.6	(0.5-0.8)
	50-64	213	33.6	2.4	(2.1-2.8)	22	15.8	0.3	(0.2-0.4)
	65+	139	21.9	2.2	(1.9-2.6)	9	6.5	0.1	(0.1-0.3)
Gender	Female	27	4.3	0.1	(0.1-0.2)	21	15.1	0.1	(0.1-0.2)
	Male	607	95.7	3.0	(2.8-3.3)	118	84.9	0.6	(0.5-0.8)
Place of occurrence	Victim's home	489	77.1	1.2	(1.1-1.3)	61	43.9	0.2	(0.1-0.2)
	Other	145	22.9	0.4	(0.3-0.4)	78	56.1	0.2	(0.2-0.3)
Type of firearm	Handgun	106	16.7	0.3	(0.2-0.3)	60	43.2	0.2	(0.1-0.2)
	Long gun[4]	518	81.7	1.3	(1.2-1.4)	31	22.3	0.1	(0.1-0.1)
	Other and undetermined	10	1.6	0.0	(0.0-0.0)	48	34.5	0.1	(0.1-0.2)
Intrafamilial violence[5]	No	620	97.8	1.5	(1.4-1.6)	119	85.6	0.3	(0.3-0.4)
	Yes	14	2.2	0.0	(0.0-0.1)	20	14.4	0.0	(0.0-0.1)
Geographical area[6]	Montréal CMA	157	24.8	0.8	(0.7-0.9)	96	69.1	0.5	(0.4-0.6)
	Other CMAs	98	15.5	1.2	(1.0-1.4)	10	7.2	0.1	(0.1-0.2)
	Urban centre	97	15.3	2.1	(1.7-2.5)	7	5.0	0.2	(0.1-0.4)
	Rural area	282	44.5	3.4	(3.1-3.9)	26	18.7	0.4	(0.2-0.5)
Total		**634**	**100**	**1.5**	**(1.4-1.7)**	**139**	**100**	**0.4**	**(0.3-0.4)**

Source: Computerized database of the Bureau du coroner du Québec [Québec coroner's office] for 2009 to 2013: data extracted in December 2015, MSSS, *Perspectives démographiques basées sur le recensement de 2006* [demographic perspectives based on the 2006 Census], special extraction by geographical area.

1 Total number of deaths for the period 2009-2013.

2 Death rate per 100 000 person-years for the period 2009-2013.

3 Confidence interval of 95% for death rates.

4 Long guns are non-restricted firearms (e.g., rifles and shotguns).

5 The victims of suicides and homicides committed in a context of intrafamilial violence were members of the same household.

6 Four categories of geographical areas were defined: Montréal census metropolitan area (CMA), other CMAs with between 10 000 and 100 000 inhabitants, i.e., Québec, Trois-Rivières, Sherbrooke, Gatineau and Chicoutimi-Jonquière, and rural areas with towns and villages of less than 10 000 inhabitants.

2 Controlling access to firearms in the home can prevent deaths

The presence of a firearm in the home: a risk factor for death

The scientific literature clearly shows that the presence of a firearm in the home places the members of the household at greater risk of suicide, homicide and accidental death. In fact, several studies conducted with data aggregated at the national or regional level (ecological studies) have revealed that the percentage of households that own at least one firearm is associated positively with national and regional rates of firearm-related suicide, homicide and accidental death (Hemenway, 2011; Killias, 1993; Shenassa et al., 2004; Guralnick, 2007).

Similarly, several studies conducted with data pertaining directly to victims of firearm fatalities (case-control studies) have shown that the presence of a firearm in the home significantly increases the risk of firearm-related suicide, homicide and accidental death among the members of the household (Miller et al., 2016; Anglemyer et al., 2014; Hemenway and Solnick, 2015).

For example, two U.S. studies often cited in the scientific literature have shown that individuals living in a home where there is a firearm are 4.7 times more likely to commit suicide (Kellerman et al., 1992) and 2.7 times more likely to commit homicide (Kellerman et al., 1993) than individuals who live in a home where no firearms are present. Similar results were obtained in a recent meta-analysis (Anglemyer et al., 2014) conducted using the results of 14 studies on suicide risk and 5 studies on homicide risk. [The results of this meta-analysis demonstrated that the presence of a firearm in the home increases the risk of suicide by 3.24 times (CI95%: 2.41 to 4.40) and the risk of homicide by 1.94 times (CI95%: 1.44 to 2.93)].

Storing firearms safely reduces the risk of death

Several studies have demonstrated that safe storage of firearms reduces the risk of firearm-related suicide among young people and adults (Grossman et al., 2005; Shenassa et al., 2004; Kellerman et al., 1992) as well as the risk of accidental firearm-related death among children and adolescents (Grossman et al., 2005). Each of the following storage practices has an independent protective effect on these two types of death: (1) the firearm is stored unloaded; (2) the firearm is stored with a locking device or in a locked location; and (3) ammunition is stored with the firearm in a locked location or is stored separately (Grossman et al., 2005).

These storage practices make firearms less accessible to individuals likely to misuse them, such as children and adolescents (accidental deaths) and people with suicidal thoughts, particularly when they are not the owners of the firearms. A study conducted in Québec revealed that roughly one third of people who used a firearm to commit suicide did not own the weapon in question (St-Laurent and Tennina, 2000). Moreover, three studies in the United States found that most of the adolescents and young adults who used a firearm to commit suicide used a weapon belonging to one of the members of their household, usually one of their parents (Johnson et al., 2010; Wright et al., 2008; Grossman et al., 1999).

Controlling access to firearms: an essential measure for suicidal individuals

A large number of studies have shown that most suicide victims were suffering from mental health problems (e.g., depression) (Nock et al., 2008; Nordentoft, 2007; Gould et al., 2003; Moscicki, 2001) or personal or circumstantial problems (e.g., adolescent relationship breakup, drug addiction) (Johnson et al., 2010; Gouvernement du Québec, 1998; Gouvernement du Québec, 1997) before they

committed suicide. For people faced with these types of problems, having access to a firearm is a "facilitating" factor for acting on suicidal thoughts (Florentine and Crane, 2010). Access to a firearm also increases the risk of suicide because such weapons are the most lethal means used to attempt suicide, with a case fatality rate of between 82.5% and 96.5% according to the studies consulted (Shenessa et al., 2003; Spicer and Miller, 2000).

Several observations derived from the scientific literature show that it is possible to reduce the suicide risk by controlling access to firearms: (1) a large proportion of suicide attempts are not planned long in advance; (2) in half of cases, the suicidal crisis is short-lived (less than 10 minutes); (3) the likelihood that a suicidal individual will replace a firearm by another more accessible means during a suicidal crisis is low; and (4) only a minority of people who attempt suicide will eventually commit suicide in the years following the initial attempt (Florentine and Crane, 2010; Deisenhammer et al., 2009; Daigle, 2005). Preventing suicidal individuals from gaining access to a firearm during a suicidal crisis gives them an opportunity to get help once the crisis is over (Florentine and Crane, 2010; Daigle, 2005).

Firearms and spousal violence

The scientific literature shows that the presence of a firearm in the home increases risk of spousal homicide, as well as the severity and lethality of the spousal violence involved (Zeoli et al., 2016; Sorenson, 2006). Furthermore, it has been demonstrated that firearms are the method most commonly used in spousal homicides that are followed by suicide (Panczak et al., 2013; Tremblay, 2012). When a firearm is accessible in situations of spousal violence, it may be used by the violent spouse to threaten or intimidate the victim (Hemenway, 2011).

A number of evaluative studies have looked into control of access to firearms as a spousal homicide prevention measure (Zeoli et al. 2016). These studies have focused on three types of measures that specifically target individuals involved in situations of spousal violence: (1) the first type of measure is designed to prohibit people who are under a protection order for spousal violence from owning or acquiring a firearm; (2) the second type of measure applies this same restriction to offenders convicted of a spousal violence offence; and (3) the third type authorizes the police to remove firearms from a home during an incident of spousal violence. According to the observed results, only the first type of measure, that is, prohibiting people who are under a protection order from owning or acquiring firearms, has been associated with a reduction in spousal homicides. According to the authors, the lack of observed results for the two other types of measures could be due to methodological limitations, such as failing to consider the implementation of such measures.

Highlights

- The presence of a firearm in the home is an important risk factor for suicide, homicide and accidental death for all members of the household.
- Controlling access to firearms is important for individuals who are likely to misuse them, particularly young people and individuals at risk of having suicidal thoughts.
- It is important that all firearms kept in the home are stored safely. Special attention must be paid to ensuring that individuals who are suffering from mental health or personal problems have access to competent resource people when they need them in order to avoid an initial suicidal crisis or to prevent a subsequent one.
- Care plans for such individuals must aim above all to make their homes safe by removing all of the firearms they own and, if applicable, by ensuring that any firearms belonging to other members of the household are stored safely.
- Controlling access to firearms also has the potential to prevent spousal homicides, particularly by prohibiting individuals who are under a protection order from owning or acquiring a firearm.

3 Gun control laws are effective for reducing firearm-related deaths

In 2011, nearly 8 million firearms were registered in Canada and, of that number, slightly over 1.7 million (22%) were registered in Québec. More than 7 million (91%) of those registered in Canada and 1.6 million (95%) of those registered in Québec were non-restricted firearms. In 2014, it was estimated that close to 2 million people had a firearms licence in Canada, including nearly 500 000 people (25%) in Québec (Royal Canadian Mounted Police, 2015).

Several legislative and administrative measures have been adopted in Canada since 1977 in order to control the possession, acquisition, transportation and storage of firearms. These measures were introduced gradually following the passage of three pieces of draft legislation: Bill C-51 in 1977, Bill C-17 in 1991 and Bill C-68 in 1995 (see Appendix 1 for more details).

History of legislation on firearms control in Canada

- **C-51**: This bill included, in particular, the requirement to obtain a firearms acquisition certificate in order to acquire a firearm and, in the case of businesses, the requirement to hold a firearms and ammunition business permit (passed in 1977).
- **C-17**: This bill was aimed at improving the firearms licencing system and required, among other things, that applicants provide two references with their application as well as more detailed personal information. Applicants were also required to successfully complete training on the safe handling of firearms. In addition, individuals had to comply with more stringent standards on the safe storage, handling and transportation of firearms. Provision was also made for increased penalties for firearm-related crimes (passed in 1991).
- **C-68**: This bill stipulated, in particular, that all owners of non-restricted firearms (e.g., rifles and shotguns) had to hold a licence to possess this type of firearm and a registration certificate for each firearm they owned. The bill also introduced new *Criminal Code* offences and harsher mandatory penalties for certain serious crimes committed with firearms (passed in 1995).

3.1 Review of the scientific literature on the impact of gun control laws

Systematic reviews and meta-analyses are the most rigorous methods available for measuring the effectiveness of public health and safety interventions (Blais and Cusson, 2007).[2] Systematic reviews have been conducted to estimate the impact of gun control laws on firearm-related deaths. These reviews have produced general findings about the impact of laws on firearm-related deaths and have identified the most reliable studies.

A systematic review was published recently by a group of U.S. researchers from the *Mailman School of Public Health* of *Columbia University* (Santaella-Tenorio et al., 2016). This review identified 3799 studies on the issue of firearms control and firearm-related deaths around the world. Of that number, 130 studies met the researchers' inclusion criteria. After analyzing these studies, the authors concluded that: "1) the simultaneous implementation of laws targeting multiple elements of firearms

[2] "Systematic reviews use rigorous methods for locating, appraising, and synthesizing evidence from prior evaluation studies… They have explicit objectives, explicit criteria for including or excluding studies, extensive searches for eligible evaluation studies from around the world, careful extraction and coding of key features of studies, and a structured and detailed report of the methods and conclusions of the review" (Farrington and Welsh, 2001: 11). Systematic reviews are also based on the most reliable scientific evidence for reaching conclusions about the prevention potential of public health and safety interventions.

regulations reduced firearm-related deaths in certain countries; 2) some specific restrictions on purchase, access, and use of firearms are associated with reductions in firearm death …" (Santaella-Tenorio et al., 2016: 152). Such laws are effective for reducing both suicide and homicide. A similar finding emerged from a study published recently in *The Lancet*, which stressed the importance of implementing background checks during the sale of firearms (Kalesan et al., 2016).

Impact of Canadian legislation on suicide

Few studies have assessed the impact of Canadian gun control legislation on the suicide rate. A study conducted by Gagné (2008) assessed the impact of bills C-51, C-17 and C-68 on the suicide rate in Canada. The study focused on the period 1974 to 2004 and used a multiple time series design to control for temporal variations in the suicide rate and variations among the provinces. The results indicate that Bill C-51 was followed by an increase in the suicide rate, while Bill C-68 was associated with a significant decrease in firearm-related suicide, with no substitution effect. Additional analyses revealed that this impact translated into an average reduction of 250 suicides per year between 1998 and 2004 (INSPQ, 2010).

Two studies by Caron (2004) and Caron et al. (2008) assessed the impact of Bill C-17, introduced in 1991, on the suicide rate in Québec. The results suggest that this bill was not associated with a decrease in suicide. Indeed, substitution effects offset the reduction in firearm-related suicide. However, both of these studies had a very short post-intervention period, which may have prevented them from capturing the full impact of the legislation because the measures were brought in gradually and the people targeted complied with them gradually (Gagné et al., 2010). Another study examined the change in the male suicide rate in Québec between 1981 and 2006 to see if the change in this rate coincided with the introduction of Bill C-17 (Gagné et al., 2010). The authors concluded that this bill was associated with a decrease in the firearm-related suicide rate among males, particularly younger males. However, they said that this effect could not be attributed entirely to the bill because reductions in the rate of suicide committed with other methods were also observed.

Impact of Canadian legislation on homicide

Systematic reviews of the impact of Canadian laws have made it possible to identify studies meeting specific methodological criteria and whose findings can be used to assess the impact of these laws with greater certainty.[3] This is the case of a study by Mauser and Holmes (1992), who evaluated the impact of Bill C-51 on homicide. The authors used a design that anabled them to pinpoint variations in the homicide rate over time (1968-1988) and among the provinces. Their analyses showed that Bill C-51 did not have a significant impact on homicides in general. However, the authors did not specifically estimate the bill's impact on firearm-related homicides. It is probable that the impact of the bill was diluted given that only 30% to 45% of homicides were committed with firearms between 1968 and 1988 (Savoie, 2003).

Another study examined the impact of bills C-51, C-17 and C-68 on homicides in Canada (Blais et al., 2011). This study used a design that accounted for variations in the homicide rate over time (1974-2004) and among the provinces.[4] By incorporating several control variables and taking into account the trend already observed in homicide rates, the authors estimated that bills C-51 and C-68 were associated with significant reductions in homicides committed with a firearm. These reductions were not offset by an increase in homicide committed with other methods. The impact of Bill C-68

[3] In particular, these studies incorporate control variables, include multiple observation points, use appropriate analytical strategies, employ control groups (or the equivalent) and use provinces as their spatial units of analysis. This last characteristic is particularly important because the firearm-related death rate, the availability of firearms and law enforcement activities vary from one province to another.

[4] The Atlantic Provinces (Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick) were grouped together.

was more pronounced than that of Bill C-51. Lastly, additional analyses concluded that the drop in firearm-related homicides was due mainly to a decrease in homicides committed with a long gun. Other analyses estimated that the impact associated with Bill C-68 translated into an average decrease of 50 homicides per year between 1998 and 2004 (INSPQ, 2010).

Another study assessed the impact of Bill C-68 on homicides committed in Québec between 1974 and 2006 (Linteau and Blais, 2012). This assessment also took into account the impact of eight control variables and the trend present in the homicide rate prior to the bill's introduction. In addition, the study considered the potential impact of bills C-51 and C-17, introduced prior to Bill C-68. In order to generate robust estimates, 93 different modelling strategies were used to assess the impact of Bill-C68. The bill was associated with a significant drop in firearm-related homicides and, more specifically, in homicides committed with a long gun. No substitution effect was observed.

3.2 Additional analyses of the impact of Bill C-68 on the suicide rate in Québec

Between 1998 and 2011, the total number of suicides in Québec decreased from 1387 to 1116 (-19.5%). Over the same period, firearm-related suicides fell by 53.3%, from 285 to 133, while suicides committed using other methods fell by 10.8%, from 1102 to 983.

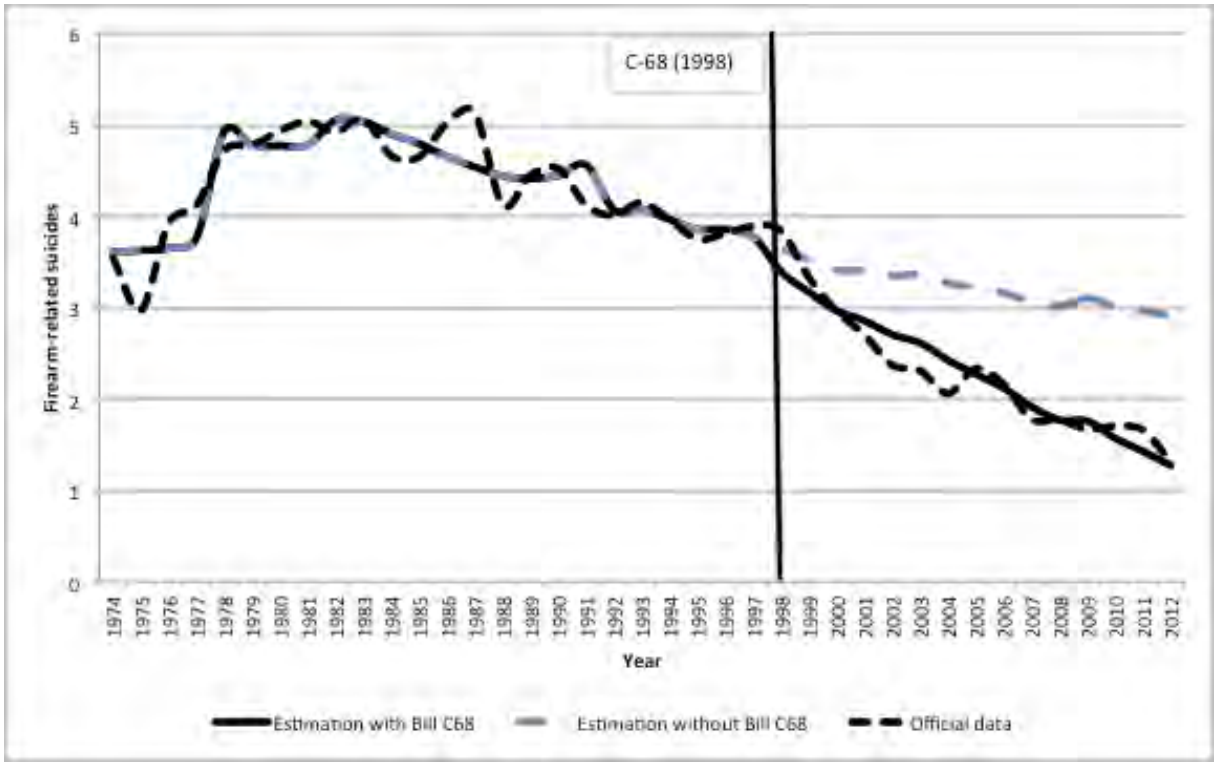
For the purposes of this brief, new analyses were produced with the most recent data for Québec in order to assess the impact of Bill C-68 on the firearm-related suicide rate. These analyses evaluated the suicide rate per 100 000 inhabitants for the period 1974 to 2012 by controlling for the trend effect, the impact of bills C-51 and C-17 (introduced in 1977 and 1991 respectively),[5] the unemployment rate, the divorce rate, the percentage of the population aged 15 to 24, and alcohol consumption. Following a preliminary analysis of the results, the percentage of young people aged 15 to 24 in the population, alcohol consumption and the divorce/separation rate were excluded from the models because of multicolinearity problems.[6] Appendix 2 provides a detailed description of the methodology used.

Figure 1 presents three curves for the change in the suicide rate: (1) a curve for firearm-related suicides estimated with all of the coefficients of model 8 (for an explanation, see Appendix 2), including Bill C-68; (2) a curve based on these same coefficients, but excluding Bill C-68; and (3) a curve showing the real change in firearm-related suicides according to official data reported by Statistics Canada. Figure 1 clearly shows that Bill C-68 prevented a significant number of firearm-related suicides. In fact, the projection made with the coefficients of model 8 corresponds very closely to the official data on suicides committed with a firearm.

[5] Bill C-17 was introduced in November 1991, but its provisions were applied gradually between 1992 and 1994. Therefore, the analyses placed the start of the bill's impact in 1992.

[6] Multicolinearity occurs when two or more independent variables are highly correlated and it is impossible to distinguish between their respective impacts on a dependent variable.

Figure 1 **Projected change (with and without the impact of Bill C-68) and observed change in firearm-related suicide rates in Québec (1974-2012)**



When the difference between the two projections – with or without the bill – is calculated, it can be seen that Bill C-68 prevented roughly 0.943 firearm-related suicides per 100 000 inhabitants in Québec during the period 1998 to 2012, or the equivalent of slightly more than 72 suicides, on average, per year. This represents 1094 suicides for the entire period concerned. It can also be concluded, based on an analysis of the data, that there was no substitution effect.

Highlights

- Systematic reviews have shown that legislation including several control measures is effective in preventing firearm-related suicides and homicides. Canada's legislation falls into this category.
- Assessments of Canadian gun control laws have revealed an uncertain impact in the case of bills C-51 and C-17 on, respectively, the reduction of suicide and homicide and the reduction of suicide.
- Bill C-68, which introduced, among other things, the requirement for all firearm owners to hold a licence and to register non-restricted firearms, reduced the number of suicides and homicides in Canada.
- Additional analyses for Québec have shown that Bill C-68 reduced firearm-related suicides, with no substitution effect.

4 The licence to possess firearms and the registration of non-restricted firearms are two necessary and complementary measures

The two main measures implemented in Canada in 1998, following the passage of Bill C-68, were as follows: the requirement for all owners of non-restricted firearms to hold a licence to possess firearms and the requirement for each owner to register each firearm that he or she owned. The information gathered when an application to possess a firearm was filed (e.g., the name and address of the holder) and when a non-restricted firearm was registered (e.g., the model and serial number of the firearm) were compiled in the Canadian Firearms Registry, which was accessible to the police at all times.

This information made it possible to establish a link between each registered firearm and its owner. However, it is no longer possible to do so given that it has not been mandatory to register non-restricted firearms since the adoption of Bill C-19 by the Canadian government in 2012. The assessments presented in the previous section show that Bill C-68 prevented firearm-related suicides and homicides. That being said, these assessments were not able to isolate the specific impact of each of the two above-mentioned measures included in this bill because these measures were introduced simultaneously. Nonetheless, the explanatory model presented below shows that these two measures were complementary (Figure 2).

Registration of firearms: an essential measure for ensuring the safety of life settings

The possibility of linking each firearm to its owner is important from a prevention standpoint because it encourages firearm owners to comply with the regulations in force in Canada concerning the purchase, storage, sale, lending or giving of firearms (Figure 2). The possibility of linking each firearm to its owner also supports the police in the performance of their duties; for instance, when they carry out a prohibition order on the possession of firearms involving a person in distress or who has committed a violent crime in a spousal context, or when they need to trace the owner of a recovered weapon or to control illegal weapons (Figure 2).

Overall, these two types of impact reduce the number of firearms that are not stored properly, that are kept in the home or that are owned illegally or lost. This makes non-restricted firearms less accessible to individuals who are likely to misuse them, such as children (accidental deaths) or individuals in crisis or distress or suffering from a mental health problem (suicides and homicides).

In 2011, one year prior to the elimination of the requirement to register non-restricted firearms in Canada, the Canadian Firearms Registry was consulted nearly 6.5 million times by the members of various organizations in Canada responsible for applying the *Firearms Act*. This corresponds to an average of 17 278 queries per day (Royal Canadian Mounted Police, 2012). These queries were made in particular to trace the owners of recovered firearms, to anticipate the presence of firearms at a location prior to going there or to seize the firearms of a person whose licence to possess firearms had been revoked. In Québec, a total of 20 555 firearms were seized by the police between 1991 and 2011 (Sûreté du Québec, February 2016, data obtained by Éric Thibault, *Journal de Montréal*): 79.6% of these firearms were long guns (non-restricted firearms). In 42.2% of the cases, the firearms were seized because of crimes against the person (e.g., aggressive behaviour, assault, sexual assault, harassment, forcible confinement, kidnapping) and in 7.5% of the cases, the firearms were seized because of suicide or attempted suicide. Long guns accounted for 87.6% of the firearms used in crimes against the person and for 92.0% of those used in suicides and attempted suicides.

In the model shown in Figure 2, the licence to possess firearms and the registration of non-restricted firearms are presented as two necessary and complementary measures. In fact, the Supreme Court of Canada acknowledged the complementary nature of these two measures in a judgment concerning the constitutionality of the *Firearms Act* (Supreme Court, 2000: judgment). The judgment states:

> The registration provisions cannot be severed from the rest of the Act. The licensing provisions require everyone who possesses a gun to be licensed; the registration provisions require all guns to be registered. These portions of the *Firearms Act* are both tightly linked to Parliament's goal of promoting safety by reducing the misuse of any and all firearms. Both portions are integral and necessary to the operation of the scheme.

The Supreme Court also states in this judgment that all firearms are by their very nature dangerous and that:

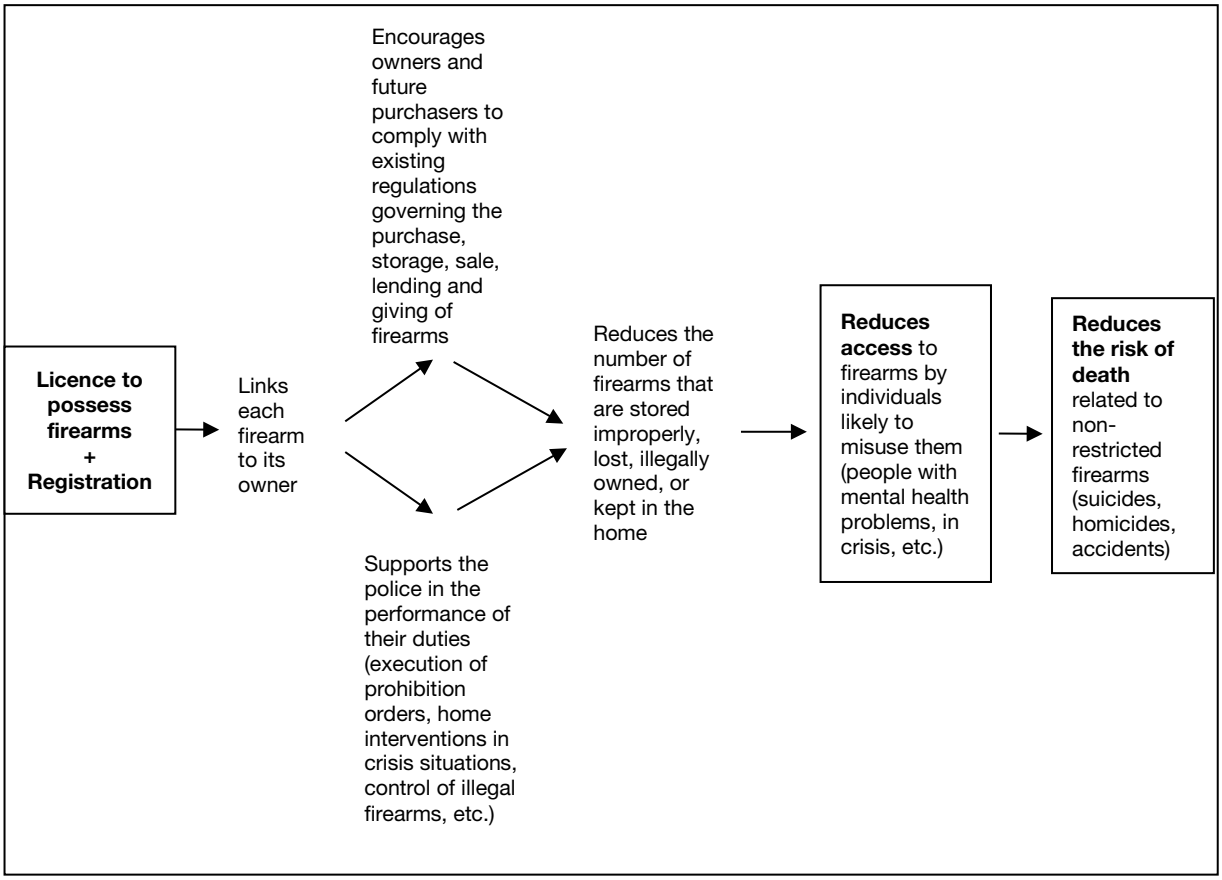
> … while ordinary guns are often used for lawful purposes, they are also used for crime and suicide, and cause accidental death and injury. Guns cannot be divided neatly into two categories – those that are dangerous and those that are not dangerous. All guns are capable of being used in crime. All guns are capable of killing and maiming. It follows that all guns pose a threat to public safety (paragraph 45).

From this perspective, it is important to set up a registry for non-restricted firearms in Québec, and more specifically, to reinstate the requirement to register this type of firearm as proposed in Bill 64.

The possession and acquisition licence: an essential condition for acquiring a firearm

It has not been mandatory since 2012 to verify whether a person who acquires a non-restricted firearm holds a valid possession and acquisition licence. This has created a gap in the safety net since systematic verification prior to the issuance of a licence made it possible to ensure that the future purchaser was fit to own a firearm. Indeed, when a person applied for a licence, a pre-established process for making background checks was applied (e.g., the applicant's personal history and judicial record were verified, and confirmation was obtained from two individuals in the person's circle of friends and family, including his or her current or former spouse, that there was no reason to prevent the person from owning a firearm). However, Bill 64 does not contain any provisions to fill this gap. Therefore, individuals who are ill-intentioned, in distress or in crisis may be able to obtain a firearm even though they do not have a valid licence, which is not a desirable situation. For this reason, we believe that it is important to amend Bill 64 to make it mandatory to verify a person's firearm possession and acquisition licence when he or she takes possession of a firearm and applies to register it. This recommendation is all the more important given that, as mentioned earlier, conducting background checks during the sale of a firearm is acknowledged to be an effective prevention measure.

Figure 2 Explanatory model of the impact of the licence to possess firearms and the registration of non-restricted firearms on the reduction in firearm-related deaths



In short

- Requiring that all firearm owners hold a licence and that they register non-restricted firearms are two necessary and complementary measures for ensuring public safety because they make it possible to link each firearm to its owner.
- By making it possible to link each firearm to its owner, these two measures encourage owners to comply with the regulations in force and to support the police in the performance of their duties, particularly those aimed at making life settings safe.

Conclusion and recommendations

Legislation on the control of firearms is not intended to limit their use for recreation and sport, but to ensure that they are not accessible to individuals who are likely to misuse them against themselves or other people.

Bill C-68, which introduced, among other things, the requirement for all firearm owners to hold a licence to possess firearms and the requirement to register non-restricted firearms, prevented firearm-related deaths in Canada, particularly suicides. These two measures are necessary and complementary. Therefore, the advantages of implementing a registration system for non-restricted firearms are undeniable from a public health standpoint.

In light of the key findings described in this brief, the Institut national de santé publique du Québec recommends that:

- It be made mandatory in Québec to register firearms as stipulated in Bill 64.
- Bill 64 be amended to make it mandatory to verify a person's possession and acquisition licence when he or she takes possession of a firearm or files a firearm registration application.

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Appendix 1

Gun control legislation in Canada

Gun control legislation in Canada

Three main pieces of draft legislation have been adopted in Canada since 1977. First, Bill C-51 received Senate approval and Royal Assent on August 5, 1977. The two most important changes in this bill included the requirement to obtain a firearms acquisition certificate in order to acquire a firearm and the requirement for businesses to hold a firearms and ammunition business permit. Other changes included the following: (1) individuals could no longer carry a weapon to protect their property; (2) automatic weapons were prohibited (except if they were registered before January 1, 1978); (3) new offences were added to the *Criminal Code*; (4) mandatory minimum sentences were introduced; and (5) police were given increased search and seizure powers. Under this bill, authorization to acquire a firearm was refused if an applicant had a criminal record for a violent offence committed within the previous five years or had been treated for a mental disorder involving violence.

Second, Bill C-17 was passed in the House of Commons on November 7, 1991 and received Senate approval and Royal Assent on December 5, 1991. Its provisions came into force between 1992 and 1994. To improve the firearms licensing system, applicants were required to: (1) provide a photograph and two references with their application; (2) wait 28 days for the firearm to be delivered; (3) successfully complete training on the safe handling of firearms and the legislation governing such weapons; and (4) provide more detailed personal information. Individuals were required to comply with stricter standards on the safe storage, handling and transportation of firearms. In addition, new controls on military, paramilitary and high-firepower guns came into force: (1) large-capacity cartridge magazines for automatic and semi-automatic firearms were prohibited; (2) automatic firearms converted to avoid the prohibition provided for in Bill C-17 were also prohibited; and (3) most para-military rifles and certain types of non-sporting ammunition were henceforth classified as restricted or prohibited. Firearms dealers were subject to new regulations, and new offences were added to the *Criminal Code*. Lastly, harsher penalties were introduced for firearm-related crimes.

Third, Bill C-68 was, to date, the last major change made to Canada's firearms control legislation. It received Senate approval and Royal Assent on December 5, 1995. The provisions of the bill came into force gradually between 1996 and 2003. The new *Criminal Code* offences and mandatory minimum sentences came into effect in 1996. The *Firearms Act* and its regulations came into force gradually as of 1998. Bill C-68 took the administrative and regulatory aspects of the firearms licensing and registration system out of the *Criminal Code*. Under the Canadian Firearms Registration System, firearm owners had until 2003 to register all of their firearms. They also had to hold a valid registration certificate for all firearms in their possession, including rifles and shotguns. In 2001, a new firearms licensing system came into effect. From then on, a licence was needed to acquire and possess firearms and to possess ammunition. Businesses also had to hold a registration certificate for all of the firearms they owned. Bill C-68 prohibited most .25 and .32 calibre handguns with a barrel length of less than 105 mm. Lastly, it added new offences to the *Criminal Code* and brought in harsher mandatory sentences for certain serious crimes involving firearms.

When the Conservatives took power in 2006, amnesty was granted to firearm owners who had not renewed their licences or registered their firearms. This amnesty remained in effect from 2006 to 2011. The firearms registry was abolished on April 5, 2012 when Bill C-19 was introduced.

Appendix 2

Methodological considerations pertaining to the additional analyses for Québec

Methodological considerations pertaining to the additional analyses for Québec

Data sources

The data on suicide were derived from Table 102-0551 of Statistics Canada and include death codes X60 to X84, and Y87.0. The data on Canada's firearms control legislation were taken from documents published by the Royal Canadian Mounted Police (RCMP) and the Department of Justice (RCMP, 2009, 2012 and 2015; Ministère de la jurtice, 2003). Lastly, the data on unemployment rates, alcohol consumption and divorce/separation rates were taken from various Statistics Canada catalogues. The data were available for the period 1974-2012.

Variables studied

Dependent variables

In this study, the impact of Bill C-68 was estimated using two main dependent variables. The first dependent variable was the number of suicides committed with firearms per 100 000 inhabitants, while the second dependent variable was the number of suicides committed with other methods per 100 000 inhabitants. This latter variable also served as a time series with a nonequivalent control group (Shadish et al., 2002). In other words, it was not expected to be affected by the introduction of Bill C-68. If the number of suicides involving firearms and other methods fell after the introduction of Bill C-68, it would be reasonable to suggest that this decrease was due to other factors. If firearm-related suicides decreased and suicides involving other methods increased after the introduction of Bill C-68, this would mean there was a substitution effect (Blais et al., 2011).

Independent variables

The independent variables of interest were those that could be used to detect the impact of Bill C-68. The bill came into effect in December 1995. The new offences and harsher sentences were introduced as of early 1996, whereas the *Firearms Act* came into force gradually between 1998 and 2003. Various models were used in an effort to determine whether the impact began in 1996 or 1998. The first independent variable ("intervention") was dichotomous and referred to the introduction of the bill. The units of analysis for the pre-intervention period were given a value of "0" (1974 to 1996 or 1974 to 1998, depending on the models) and the units of analysis for the post-intervention period were given a value of 1 (1996 to 2012 or 1998 to 2012). This variable made it possible to detect changes in the constant of the series. The second independent variable ("post-intervention trend") was a continuous variable that took into account the number of years that had elapsed since the introduction of Bill C-68. This variable estimated changes in the trend of the series.

Control variables

Other independent variables were included in the analyses in order to overcome biases related to concomitant factors. A trend variable indicated in years the time since the beginning of the study period (1974) to the end of the period (2012). The trend controlled for all factors likely to be responsible for a downward trend in suicides. The suicide trend was not necessarily linear and other variables were also included in our models. Variables C-51 and C-17 took into account the impact of bills introduced prior to Bill C-68. These two variables were dichotomous. In the case of Bill C-51, observations pertaining to the years 1974 to 1977 were included in the pre-intervention period and given a value of "0", while the others were included in the post-intervention period and given a value of 1. The observations pertaining to 1974 to 1991 were given a value of "0" and those pertaining to 1992 to 2012 were given a value of 1 in order to capture the potential impact of Bill C-17.

Other factors besides bills C-17 and C-51 are likely to have affected the suicide rate. Therefore, the models controlled for the impact of the unemployment rate, alcohol consumption (expressed as litres of pure alcohol consumed per capita), the divorce/separation rate per 100 000 inhabitants and the percentage of the population between the ages of 15 and 24.

Analytical strategy

First, charts were presented in order to describe trends for suicides involving firearms or committed with other methods (See figure 3 in appendix 3). Second, interrupted time series analyses were done using an auto-regressive integrated moving average (ARIMA) model (Box et al., 1994). Interrupted time series are particularly useful for determining whether the introduction of an intervention at a specific time is associated with a change in the behaviour of a time series (Biglan et al., 2000; Shadish et al., 2002).

Multiple linear regression based on the principle of least squares is underpinned by a series of assumptions concerning the distribution of error terms. Such terms must be randomly, independently and normally distributed and have constant variance (Lewis-Beck, 1980). The main consequence of a significant autocorrelation between error terms is that the error terms are estimated downwards, leading to an overestimation of the explanatory power of an intervention (Biglan et al., 2000). Unlike regression, ARIMA models correct for autocorrelation of error terms.

Given that the suicide series had a unique structure, ARIMA modelling was carried out using an iterative process consisting of three stages: (1) identification, (2) estimation and (3) diagnosis. During the identification stage, autocorrelation and partial autocorrelation matrices were inspected to respectively detect trends in the series, and autoregressive (AR) and moving average (MA) parameters. Therefore, the ARIMA modelling took into account trends already present in the series and corrected for autocorrelation of error terms. Otherwise, the impact of the explanatory variables would have been overestimated. The predictive validity of the AR and MA parameters was verified in the estimation stage. During the diagnosis, the error terms were verified to ensure that they followed a white noise process. The Q-statistics were not significant ($p > 0.05$) for all models. The error terms were distributed normally and the homoscedasticity assumption was met. The analyses were done using the SPSS 21 TREND module.

Once the ARIMA models had been specified, independent variables were introduced into the models. Given that several modelling strategies were tested, the models with the lowest BIC (*Schwarz's Bayesian Information Criterion*) and AIC (*Akaike's Information Criterion)* coefficients were deemed to be the most robust (Yaffee and McGee, 2000).

Since the measures contained in Bill C-68 were implemented gradually, the data were analyzed using two different scenarios regarding the year in which the bill began to have an impact, i.e., 1996 (a few weeks after the bill was passed) and 1998 (the year in which the requirement to obtain a licence to possess firearms and a registration certificate began to come into effect). A total of eight models were tested.Models 1 to 4 estimated the impact of Bill C-68 on the firearm-related suicide rate for 1996. They made it possible to verify whether the inclusion of control variables had an effect on the bill's impact.

Model 1 verified whether Bill C-68 had an abrupt and permanent impact on firearm-related suicides. Model 2 considered that Bill C-68 could have had two types of impact on firearm-related suicides: an abrupt and permanent impact (C-68a) and/or a gradual and permanent impact (C-68a*trend). In models 3 and 4, the bill's impact was estimated using the same strategy as in model 2. However,

models 3 and 4 incorporated other control variables, i.e., bills C-17 and C-51 and the unemployment rate.

Results in models 2 to 4 revealed that Bill C-68 was followed by an increase in the constant of the series and a decrease it its slope. However, the preventive effects exceeded the negative effects that followed the introduction of the bill. The results of these analyses are presented in Table 2 of Appendix 3. Models 5 to 8 estimated the impact of Bill C-68 for 1998 according to the same parameters as those used for models 1 to 4 described above. The results were more or less the same. That being said, the goodness-of-fit indices (AIC and BIC) showed that model 8 was the one that best predicted firearm-related suicides. Therefore, this model was used to assess the impact of Bill C-68. The results of these analyses are presented in Table 3 of Appendix 3.

Appendix 3

Additional tables and figure (further to Appendix 2)

Figure 3 Suicide rate by different methods in the province of Québec between 1981 and 2011

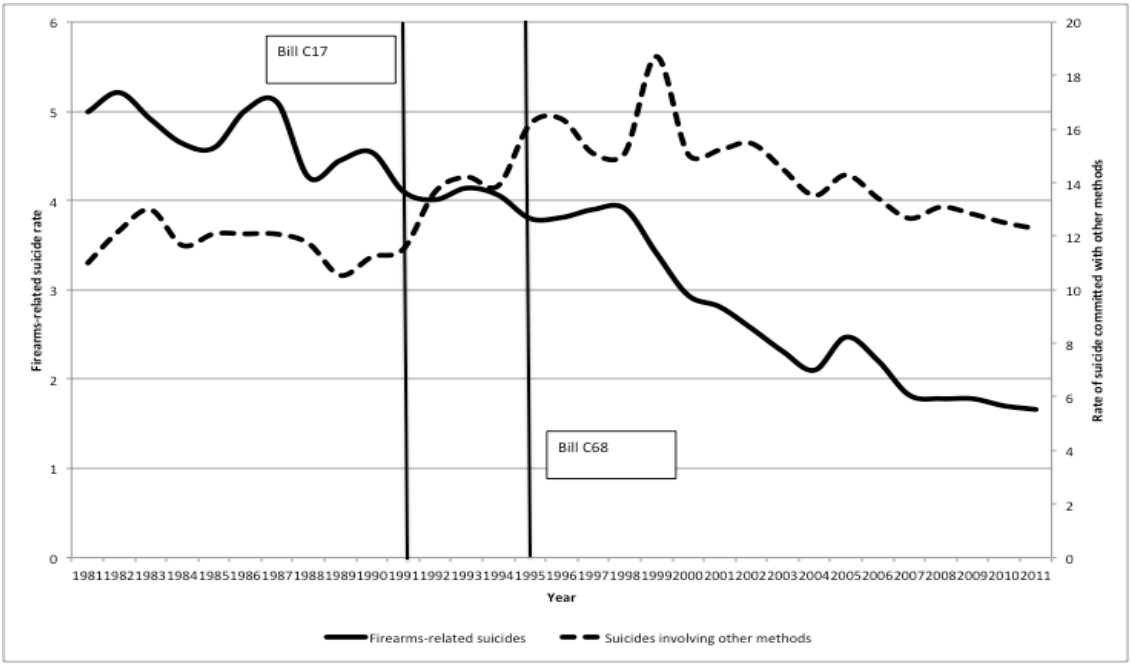

Table 2 Effect of Bill C68 on firearm-related suicides – effect starts in 1996 (abrupt and gradual effects)

	Model 1		Model 2		Model 3		Model 4	
	β	SE	β	SE	β	SE	β	SE
Autoregressive parameters of the model								
AR1	0.911**	0.056	0.777**	0.103	0.248	0.179	0.129	0.181
Variables associated with Bill C68								
C68a	0.074	0.364	4.119**	1.488	2.727**	0.740	2.355**	0.655
Trend*C68a	---	---	-0.184**	0.063	-0.125**	0.029	-0.102**	0.027
C68b	---	---	---	---	---	---	---	---
Trend*C68b	---	---	---	---	---	---	---	---
Other laws and control variables								
Trend	-0.069*	0.032	0.002	0.032	-0.034	0.022	-0.036	0.020
C17	---	---	---	---	-0.406	0.274	-0.512*	0.249
C51	---	---	---	---	1.307**	0.275	1.130**	0.249
Employment	---	---	---	---	---	---	0.094*	0.042
Constant	4.504**	0.792	4.159**	0.471	3.781**	0.192	2.945**	0.400
Goodness-of-fit								
AIC	33.951		30.386		21.790		18.729	
BIC	40.605		38.704		33.435		32.037	
Test for autocorrelation								
Q	0.132 (lag 1); p=0.717		0.076 (lag 1); p=0.783		0.206 (lag 1); p=0.650		0.053 (lag 1); p=0.818	
Q	1.101 (lag 2); p=0.577		0.638 (lag 2); p=0.727		4.073 (lag 2); p=0.130		2.935 (lag 2); p=0.231	

SE=standard error.

Q=Box-Ljung statistic for autocorrelation between error terms.

* $p \leq 0.05$.

** $p \leq 0.01$.

--- Variables not included in the model. These variables were excluded from the models due to a multicollinearity problem: the percentage of people aged between 15 and 24, alcohol consumption and the divorce rate.

Table 3 Effect of Bill on firearm-related suicides – effect starts in 1998 (abrupt and gradual effects)

	Model 5		Model 6		Model 7		Model 8	
	β	SE	β	SE	β	SE	β	SE
Autoregressive parameters of the model								
AR1	0.906**	0.058	0.807**	0.089	0.160	0.175	0.105	0.180
Variables associated with Bill C68								
C68a	---	---	---	---	---	---	---	---
Trend*C68a	---	---	---	---	---	---	---	---
C68b	-0.055	0.365	4.527*	1.825	2.306**	0.781	2.225**	0.715
Trend*C68b	---	---	-0.189*	0.071	-0.111	0.028	-0.099**	0.026
Other laws and control variables								
Trend	-0.066*	0.031	-0.004	0.032	-0.037	0.020	-0.036	0.019
C17	---	---	---	---	-0.410	0.254	-0.506*	0.240
C51	---	---	---	---	1.371**	0.254	1.150**	0.266
Unemployment	---	---	---	---	---	---	0.088*	0.043
Constant	4.509**	0.767	4.165**	0.506	3.765**	0.173	2.993**	0.409
Goodness-of-fit								
AIC	33.975		30.380		20.663		18.186	
BIC	40.509		38.698		32.308		31.495	
Test for autocorrelation								
Q	0.127 (lag 1); p=0.722		0.872 (lag 1); p=0.827		0.123 (lag 1); p=0.726		0.040 (lag 1); p=0.842	
Q	1.126 (lag 2); p=0.570		0.792 (lag 2); p=0.792		4.923 (lag 2); p=0.085		3.262 (lag 2); p=0.196	

SE=standard error.

Q=Box-Ljung statistic for autocorrelation between error terms.

* $p \leq 0.05$.

** $p \leq 0.01$.

--- Variables not included in the model. These variables were excluded from the models due to a multicollinearity problem: the percentage of people aged between 15 and 24, alcohol consumption and the divorce rate.

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