

## International correlations between gun ownership and rates of homicide and suicide

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**Objective:** To examine international correlations between reported rates of household gun ownership and rates of homicide and suicide with a gun.

**Design:** Survey.

**Population:** People who responded to a telephone survey conducted by the 1989 International Crime Survey in 11 European countries, Australia, Canada and the United States.

**Results:** Positive correlations were obtained between the rates of household gun ownership and the national rates of homicide and suicide as well as the proportions of homicides and suicides committed with a gun. There was no negative correlation between the rates of ownership and the rates of homicide and suicide committed by other means; this indicated that the other means were not used to "compensate" for the absence of guns in countries with a lower rate of gun ownership.

**Conclusion:** Larger studies are needed to examine more closely possible confounding factors such as the national tendency toward violent solutions, and more information on the type and availability of guns will be helpful in future studies. Nevertheless, the correlations detected in this study suggest that the presence of a gun in the home increases the likelihood of homicide or suicide.

**Objectif :** Examiner les corrélations internationales entre le nombre rapporté d'armes à feu par ménage et les taux d'homicide et de suicide au moyen d'une arme à feu.

**Conception :** Sondage.

**Population :** Personnes qui ont répondu à un sondage téléphonique dans le cadre de l'enquête internationale sur la criminalité de 1989 dans 11 pays européens, l'Australie, le Canada et les États-Unis.

**Résultats :** Des corrélations positives ont été établies entre le nombre d'armes à feu par ménage et les taux nationaux d'homicide et de suicide ainsi que les proportions d'homicides et de suicides commis avec une arme à feu. Il n'y avait aucune corrélation négative entre le nombre d'armes à feu et les taux d'homicide et de suicide commis par d'autres moyens; cela indique que les autres moyens ne sont pas utilisés pour «compenser» l'absence d'arme à feu dans les pays où le nombre d'armes à feu est moins élevé.

**Conclusion :** Des études plus importantes sont nécessaires pour examiner le plus étroitement possible les facteurs confusionnels, comme une tendance nationale envers les solutions violentes; de plus, un plus grand nombre de renseignements sur le type d'armes à feu et l'accès à celles-ci seront utiles dans les études ultérieures. Les corrélations décelées dans cette étude suggèrent néanmoins que la présence d'une arme à feu au domicile augmente la probabilité d'homicide ou de suicide.

Gun ownership has been mentioned in connection with situational crime prevention for some time.<sup>1</sup> Empiric research, however, has provided rather weak and inconsistent support for increased efforts at gun control.<sup>2</sup> One reason may be that it has focused on cross-sectional analyses in the United States<sup>3</sup> or on evaluations over time of specific gun control measures in certain states or counties.<sup>4</sup> The difficulty with such research designs is that neither strict gun control nor passage of a new law in some states necessarily affects the number of guns in the hands of citizens, since guns continue to be sold in neighbouring states in most cases. This is well illustrated by the limited variation in the prevalence of gun ownership across US regions: 29% of households in the east, 44% in the west, 46% in the midwest and 54% in the south.<sup>5</sup> Therefore, changes in gun control policies at the state level may not affect gun availability or rates of violent crime.

Rates of gun ownership tend to vary much more among countries than within them. However, international research has received relatively little attention so far,<sup>6</sup> despite the potential of the few such studies that have been done. Clarke and Mayhew,<sup>7</sup> in comparing homicide rates in the United States and Britain, found that the US rate of homicides committed by means other than a gun was 3.7 times higher than the British rate, whereas the rate of homicides committed with a handgun was 175 to 1. They concluded that the much higher gun ownership rate in the United States may have accounted for this difference. Sloan and associates<sup>8</sup> reached similar conclusions in a comparison of crime rates in Seattle and Vancouver. The two cities had the same rates of burglary, assault and robbery and similar rates of homicide and assault without a gun. However, in Seattle the rates of assault with a firearm and of homicide with a handgun were 7 and 4.8 times higher respectively than the rates in Vancouver. Sloan and associates concluded that restricting access to handguns would reduce the rate of homicides in the community; however, this conclusion was based not on comparative survey data on gun control in the two cities but, rather, on the cities' different approaches to gun control and on indirect measures such as the number of weapon permits issued and the proportion of suicides and homicides involving a firearm. Lester,<sup>9</sup> using the proportion of suicides committed with a gun and the rate of accidental firearm-related deaths as proxy variables for private gun ownership, found substantial correlations with the rate of homicides with a firearm in 16 European nations.

The present study extends the work of these international investigations into the possible role guns play in the genesis of violent acts and the

impact situational variables have on crime in general.<sup>1</sup> The central hypothesis is that the availability of guns increases the likelihood of homicides and suicides with guns and that such acts are not merely a substitute for other forms of homicide and suicide but add to the total number. This hypothesis will be examined with the use of international correlations testing four specific propositions: (a) the rate of household gun ownership will correlate positively with the proportions of homicides and suicides committed with a gun, (b) the rate of household gun ownership will correlate positively with the rates of homicide and suicide committed with a gun, (c) the rate of household gun ownership will not be inversely correlated with the rates of homicide and suicide committed by other means (i.e., in countries with low rates of gun ownership, people will not use other means of homicide and suicide more frequently) and (d) the rate of household gun ownership will correlate positively with the overall rates of homicide and suicide committed by any means.

## Methods

International research on the impact of gun ownership on homicide and suicide rates has been hindered by the unavailability of data on ownership. In 1989 the international crime survey (ICS), through computer-assisted telephone interviews with 28 000 randomly selected people in 14 countries (Australia, Belgium, Canada, England and Wales, Finland, France, the Netherlands, Northern Ireland, Norway, Scotland, Spain, Switzerland, the United States and West Germany), collected valuable information that is the basis of information for my review. The method and other features of the ICS have been described previously.<sup>10</sup> In brief, people were asked whether there were any guns (except air rifles) in their household. If so, they were asked to identify the kind of weapon (i.e., a handgun, rifle or shotgun). To account for Switzerland's particular militia system<sup>11</sup> Swiss respondents were asked whether it was a private or military firearm. For each of the 14 countries the rates were weighted for the respondents' sex, age, household composition and region.<sup>10</sup>

Proportions of homes owning guns varied widely, from 2% in the Netherlands to 48% in the United States. Canada's rate was somewhat above average, at 29%. Cross-validation of the ICS findings against data from US and Swiss surveys revealed fairly comparable rates.<sup>12</sup> For example, a Gallup poll in 1985<sup>5</sup> revealed that 44% of US households owned some kind of gun and that 22% had handguns; the corresponding proportions in the ICS survey were 48% and 29%. Also, Kellerman and collaborators<sup>13</sup> recently found that

the validity of the measures of gun ownership were satisfactory.

Data on homicides and suicides committed with a gun (World Health Organization [WHO] codes E955 and E965) between 1983 and 1986 were gathered through correspondence with experts in several countries. Too few countries collected data on homicides committed with handguns to include this information.

Statistical analysis of bivariate correlations was done with Spearman's rank correlation coefficient. This coefficient is more appropriate for smaller samples and is less sensitive to outliers than Pearson's correlation coefficient,<sup>14</sup> although the two do not differ very much in the present case. Homicide rates from Northern Ireland had to be omitted, because the extremely high rates (three to four times that of the rest of Europe) may have been due in part to murders related to explosives, which are included in the WHO code for homicides. In relation to gun ownership and homicide rates military weapons in Switzerland were excluded because of their technical characteristics and the restricted access to ammunition.<sup>11</sup>

## Results

Table 1 displays the national rates of household gun ownership, homicide and suicide from the sources mentioned previously. It also shows the correlations between the rates of ownership and the rates of homicide and suicide overall, with a gun and by other means. All of the correlations supported propositions a, b, c and d. The correlations concerning propositions a, b and d were statistically significant. On the other hand, there was no significant negative correlation between the rate of ownership and the rates of homicide and suicide committed by means other than a gun ( $r_s = 0.441$  and  $-0.015$  respectively).

Fig. 1 displays the rates of household gun ownership against the rates of homicide with a gun; Fig. 2 gives the same information for suicides.

## Discussion

From the correlations obtained, the proportions and the rates of homicide and suicide committed with a gun as well as the overall rates committed by

Country	Rate per million				% of households with guns
	Homicide		Suicide		
	Overall	With a gun	Overall	With a gun	
Australia	19.5	6.6	115.8	34.2	19.6
Belgium	18.5	8.7	231.5	24.5	16.6
Canada	26.0	8.4	139.4	44.4	29.1
England and Wales	6.7	0.8	86.1	3.8	4.7
Finland	29.6	7.4	253.5	54.3	23.2
France	12.5	5.5	223.0	49.3	22.6
The Netherlands	11.8	2.7	117.2	2.8	1.9
Northern Ireland	46.6	35.5	82.7	11.8	8.4
Norway	12.1	3.6	142.7	38.7	32.0
Scotland	16.3	1.1	105.1	6.9	4.7
Spain	13.7	3.8	64.5	4.5	13.1
Switzerland	11.7	4.6	244.5	57.4	27.2
United States	75.9	44.6	124.0	72.8	48.0
West Germany	12.1	2.0	203.7	13.8	8.9
Spearman rank correlations					
between % of households owning guns and					
Proportion of homicides with a gun					$r_s$ value
Proportion of suicides with a gun					$p$ value*
Rate of homicide with a gun					0.608
Rate of suicide with a gun					0.915
Overall rate of homicide					0.746
Overall rate of suicide					0.900
Rate of homicide by means other than a gun					0.658
Rate of suicide by means other than a gun					0.515
Rate of homicide with a gun					0.441
Rate of suicide with a gun					-0.015
Rate of homicide by means other than a gun					< 0.02
Rate of suicide by means other than a gun					< 0.001
Rate of homicide with a gun					< 0.01
Rate of suicide with a gun					< 0.001
Overall rate of homicide					< 0.02
Overall rate of suicide					< 0.05
Rate of homicide by means other than a gun					NS
Rate of suicide by means other than a gun					NS

\*NS = not significant.

any means were related to the rate of household gun ownership. Also, the rates of homicide and suicide by means other than a gun were independent of the rate of ownership. Thus, there does not appear to be a “compensation” process — that is, residents of the countries with low rates of gun ownership did not use means other than a gun more frequently to commit homicide and suicide to make up for the absence of guns.

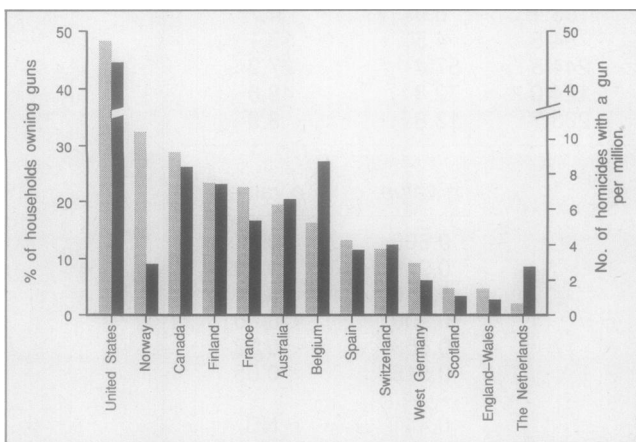
The correlation between gun ownership and suicide with a gun was stronger when the categories of firearms (rifles and shotguns, handguns, and military and private firearms) were combined instead of considered separately. For example, the correlation decreased from 0.900 (Table 1) to 0.785 if only handguns were considered or to 0.794 if (in the case of the Swiss respondents) military guns were excluded. One might conclude that, in the case of suicide at least, the mere presence of a lethal weapon shapes the outcome of an acute crisis, whatever the legal status or the technical characteristics of the weapon may be.

The higher correlation of gun ownership with the overall homicide rates than with the overall suicide rates may have been because there was a generally higher proportion of homicides than of suicides committed with a gun; thus, the chance that any change in the proportion of homicides with a gun will affect the overall rate of homicides is increased. The stronger relation between gun ownership and suicide than between gun ownership and homicide may be explained by the relative typical frequency of these events in a private home (i.e., where guns are kept by most gun owners<sup>13</sup>), since suicide usually occurs in a private setting. Homicide, on the other hand, may involve strangers more frequently and therefore takes place more often outside the victim’s or the offender’s home; however, unlike in the United States<sup>15,16</sup> homicide still

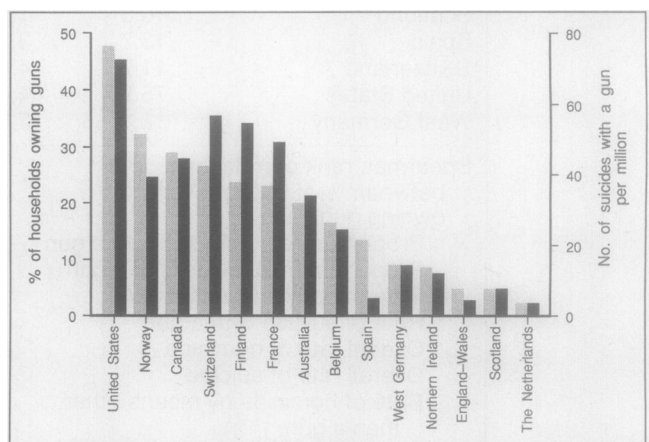
involves predominantly relatives and intimate acquaintances in most European countries.<sup>17-19</sup>

Several methodologic considerations, most obviously the small number of nations studied, limit the generalizability of the findings. The cross-sectional nature of the study and the fact that the homicide and suicide rates were collected for several years before the gun ownership rates makes it difficult to draw causal inferences. Even if one assumes that the international rates will be stable over time in the relevant variables, it remains to be seen whether the rate of gun ownership within a country affects crime levels or whether people buy guns in the presence of high crime rates. Although the homicide data confirm proposition c, the number of homicides by means other than a gun do increase with increasing levels of gun ownership. This increase, although not statistically significant, raises the possibility that a general structural or cultural variable (e.g., the “gun culture” of the American west, in which use of guns was once part of a general acceptance of violent solutions) could also influence the ownership rate.<sup>20,21</sup> In the case of suicide, however, it does not seem plausible that higher rates would stimulate the purchase of guns. Possible intervening variables suggested so far in the literature are intuitively not very convincing; for example, Kleck<sup>20</sup> argued that depressed people might rely more than others on guns for self-protection.

In the debate on gun control, proponents often invoke the argument that there is a higher risk of death in encounters involving guns, as US studies seem to show.<sup>15,22</sup> Unfortunately, the data presented here do not allow an evaluation of the seriousness of consequences related to the availability of guns, since WHO mortality statistics do not cover attempts. Even police data on attempted homicides are not conclusive in this area, since police officers’ definitions of situations typically depend on the



**Fig. 1: Relation between rate of household gun ownership (screened bars) and rate of homicide with a gun (black bars) in 13 countries.**



**Fig. 2: Relation between rate of household gun ownership (screened bars) and rate of suicide with a gun (black bars) in 14 countries.**

presence (or absence) of guns: whenever a gun has been used, the chances increase that the incident will be recorded as attempted murder, whereas it might otherwise be labelled as assault.<sup>18,19</sup>

Although homicide and suicide are complex events to which many factors contribute, it seems reasonable to take the correlations observed here as an indication that guns are among the factors playing a role in these acts. Future research should involve more countries in the ICS survey and should ask for more detailed information on the type of guns owned and their availability.<sup>22</sup>

In terms of the political agenda, the question is whether the ever-increasing trend in gun ownership can be reversed as long as the possibility can be entertained that guns are not as dangerous as the observed correlations and common sense would suggest.<sup>6,22</sup> Given the absence of controls for passengers and goods at the borders of US states, there may be only limited variation across regions in the United States and over time as long as the gun control policies are not coordinated at some higher level.

Unfortunately, any further waiting for more convincing evidence may jeopardize more rigorous approaches to gun control, since beyond a certain point significantly reducing the number of guns in the hands of private citizens becomes a hopeless task. Therefore, the crucial policy question is: How much time do we have left to wait for more research, particularly in countries where gun ownership is not widespread and where social policies aimed at restraining its increase might be most beneficial in terms of reducing violence?

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