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Firearm Homicide in Australia, Canada, and New Zealand: What Can We Learn From Long-Term International Comparisons?

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Abstract

Although firearm homicide remains a topic of interest within criminological and policy discourse, existing research does not generally undertake longitudinal comparisons between countries. However, cross-country comparisons provide insight into whether "local" trends (e.g., declines in firearm homicide in one particular country) differ from broader, international trends. This in turn can improve knowledge about the role of factors such as policing practices and socioeconomic variables in the incidence of lethal violence using firearms. The current study compares long-term firearm homicide trends in three countries with similar social histories but different legislative regimes: Australia, Canada, and New Zealand. Using negative binomial regression, the study found that the most pronounced decline in firearm homicide over the past two decades occurred in New Zealand. Connections between social disadvantage, policing policy, and violence are discussed.

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Although firearm homicide remains a topic of significant interest within criminological and violence reduction policy discourse, longitudinal research on trends in firearm deaths is relatively limited, and—perhaps due to the relatively small samples for firearm homicide in most developed nations—tends to focus on firearm suicide rather than interpersonal violence. In the context of suicide, several studies have found evidence of displacement from firearms to other methods and/or an absence of overall declines in suicide following periods of legislative reform or no evidence of impacts on preexisting trends in firearm suicide (Beautrais, Fergusson, & Horwood, 2006; Bridges, 2004; Caron, 2004; Caron, Julien, & Huang, 2008; De Leo, Dwyer, Firman, & Neulinger, 2003; De Leo, Evans, & Neulinger, 2002; Leenaars & Lester, 1996).

The majority of studies that examine trends in firearm deaths evaluate a single country or state/province, before and after significant epochs of legislative reform, and the results and conclusions vary considerably (Killias, Van Kesteren, & Rindlisbacher, 2001). This level of inconsistency was reflected in a recent metareview of U.S. firearms legislation research, which came to the conclusion that "the evidence available from identified studies was insufficient to determine the effectiveness of any of the firearms laws reviewed singly or in combination" (Hahn et al., 2005, p. 40).

Though valuable in elucidating potential impacts and/or limitations of legislative change, existing research does not generally provide long-term comparisons of firearm violence between countries. However, long-term cross-country comparisons can deliver important contextual information and insight into whether "local" trends (e.g., declines in firearm homicide in one particular country) differ from broader, international trends. This can in turn assist in disentangling legislative impacts from other factors potentially affecting homicide rates and interpersonal violence, such as policing practices and socioeconomic variables.

In recognition of the value of cross-country comparisons, it has recently been proposed that the declines in firearm homicide in Australia over the past decades are the most rapid in the Western world (Dearden & Jones, 2008). However, this has not been empirically assessed. Consequently, it is not clear whether the long-term declines in firearm homicide in Australia have been more rapid than in other Western countries or whether the ongoing decline in Australian firearm homicide is commensurate with long-term declines in lethal violence recorded in other countries.

Although a number of papers have addressed local trends in firearm-related deaths (e.g., Baker & McPhedran, 2007; Klieve, Barnes, & De Leo, 2009; Lee & Suardi, 2008), Australian research does not currently offer information about whether the long-term, ongoing, downwards trend in Australian firearm homicide is unique compared to other countries. In this regard, Canada and New Zealand offer a suitable comparison against which Australian homicide trends can be assessed. Each of the three countries shares a similar social history and holds in excess of 20 years of firearm homicide data. These characteristics facilitate long-term, cross-country comparisons of lethal firearm violence. Therefore, this article compares Australian, New Zealand, and Canadian trends in firearm homicide to test the hypothesis that the long-term declines in Australian firearm homicide differ from the long-term trends in New Zealand and Canada.

Method

Publicly available firearm homicide data and population estimates were obtained from the Australian Bureau of Statistics (ABS), New Zealand Police, Statistics New Zealand, and Statistics Canada reports and online databases. New Zealand data were also drawn from Green (2008) and Thorpe (1997). Where possible, both rate and count data were obtained.[1]

Australian and Canadian records provided firearm homicide data from 1979-2007, whereas New Zealand firearm homicide data could only be gathered from 1986 onwards. Therefore, the comparisons of Australia and Canada take in 29 years of data, whereas the comparisons of those two countries with New Zealand cover a slightly shorter period of 22 years.

A series of different statistical methods were examined for their suitability of application to the dataset at hand. Goodness-of-fit tests rejected the use of Poisson regression due to overdispersion. Also, simple linear regression using rates was not a good fit for the full series of data for all three countries.

Therefore, negative binomial regressions were performed on the data, following principles set out by Klieve and colleagues (2009). Briefly, negative binomial regression models count data, such as the number of deaths within a specified population over a period of time. The estimated change in the occurrence of an event is derived by comparison of incidences over a change of one unit in the independent variable (in this case, years) and expressed as an "incidence rate ratio."

The regressions used homicide count data with population as an offset, which in practical terms expresses deaths as a rate per head of population. Though this method is not ideal for autocorrelated data, it was nonetheless the

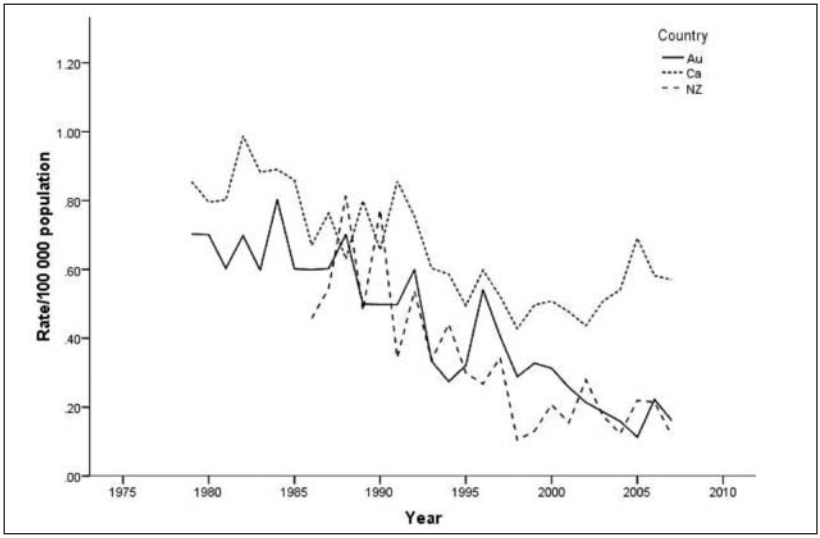

Figure 1. Firearm homicide rate by country

most suitable choice, given the specific characteristics of the dataset at hand (i.e., independent observations, a number of data points, overdispersed data). The reader is referred to Hilbe (2007) for more detailed discussion of this technique.

Separate main effect models were fit to estimate trends in firearm homicides for each country, and country comparison models incorporated an interaction term to capture differences in the relative trends over time in firearm homicide between countries. Confidence intervals are reported at the 95% level.

Results

Figure 1 shows firearm homicides as a rate/100,000 population, for each country. Given its relatively small population, New Zealand rates fluctuated more noticeably than either of the other countries in the early portion of the dataset, particularly in the earliest years of available data.

Table 1 shows individual trends for each country, and relative trends (ratios) for comparisons of Australian, Canadian, and New Zealand firearm homicide. Note that the Australian and Canadian comparison took in a longer time than the comparisons involving New Zealand, for reasons previously explained.

Table 1. Estimated Firearm Homicide Trends and Ratios

	Trend (95% CI)	Ratio (95% CI)	*p* Value
Australia	0.9461 (0.9370-0.9553)	1.0024 (0.9999-1.0050)	.064
Canada	0.9787 (0.9726-0.9849)		
Australia	0.9338 (0.9205-0.9472)	1.0408 (1.0185-1.0636)	<.001
New Zealand	0.9234 (0.9026-0.9447)		
Canada	0.9833 (0.9735-0.9932)	1.0723 (1.0512-1.0938)	<.001
New Zealand	0.9234 (0.9026-0.9447)		

Note: CI = confidence interval. Trend results vary for Australia and Canada when assessed against New Zealand, due to the shorter time period used.

Given the variation in the early years of the New Zealand data set (particularly 1987-1990), two different model specifications were tested; Model 1 that used the raw data, and Model 2 where the number of firearm homicides from 1987-1990 was replaced with the mean number of firearm homicides for those 4 years. The observed differences between New Zealand and Australia, and New Zealand and Canada, were robust to this alternate specification. Therefore, Table 1 presents only Model 1 results.[2]

The long-term trends in Australian and Canadian firearm homicide did not differ significantly. However, firearm homicide in New Zealand declined more markedly between 1986 and 2007 (around 8% per year, on average) than firearm homicides in either Australia or Canada over the same period.

The Canadian trends, though not differing from Australian trends over the full-time series, display a noteworthy feature in the most recent years of data. In some of those years, there have been "spikes" in the firearm homicide rate; 2005 is the most prominent example. Possible reasons for this finding are discussed below.

Conclusions

The proposal that Australia has experienced unique declines in firearm homicide over the past decades was not supported. Rather, it appears that the most pronounced decline in firearm homicide over the last 20 years has occurred in New Zealand (consistent with recent observations that the overall incidence of homicide in New Zealand has halved in the past two decades; see Collins, 2009), whereas Australia more closely resembles Canada in its incidence of firearm homicide. Therefore, it is not correct to assert that Australia's declines

in firearm homicide are more rapid than the declines in various other countries. Nor are the declines in Australian homicide associated with lower rates of firearm homicide, on average, relative to New Zealand. On the basis of the most recent decade of data, the firearm homicide rate in New Zealand averages 0.17 per 100,000 persons, compared with the Australian average of 0.22 per 100,000 persons.

It is pertinent to note that the level of legislative restriction surrounding firearms ownership differs between the three countries. For example, Canada and New Zealand permit the ownership and use of the types of firearms that are banned in Australia. In addition, Canada, like Australia, mandates registration of all firearms whereas New Zealand, unlike Canada and Australia, does not require registration of all firearms. However, these differences do not appear to be reflected in the long-term declines in homicide rates, suggesting the need to consider other explanations for the trends.

Existing literature highlights relationships between social disadvantage and crime (Jones-Webb & Wall, 2008; Phillips, 2002; Wilson, 1987), and there is a degree of empirical support for the hypothesis that homicide rates are associated with economic indices such as unemployment (Bellair & Roscigno, 2000; Krivo & Peterson, 2004; Lee & Slack, 2008). Although a great deal of study in this field comes from the United States and may not be wholly applicable to other countries, Australian research, too, has found associations between male youth unemployment and rates of lethal violence (Narayan & Smyth, 2004). In the current context, it is worthwhile considering socio-economic correlates of crime in relation to the three countries of interest.

There are a range of socioeconomic indicators on which New Zealand has varied from Australia and Canada over the past years, and some of these may offer insight into the apparent differences in firearm homicide trends between countries. Of particular note is that unemployment rates in Australia, New Zealand, and Canada have consistently differed. According to Labor Force Survey results from each country, after passing through the economic downturn of the early 1990s and experiencing unemployment rates in the order of 10%, all three countries have experienced declining rates of unemployment.

However, unemployment rates in New Zealand have consistently been lower than Australian unemployment rates, which have in turn been lower than Canadian unemployment rates (ABS, 2008; Statistics Canada, 2008; Statistics New Zealand, 2008). It should be noted that these figures do not differentiate between short- and long-term unemployment. Future work will assess potential relationships between unemployment and homicide rates in more detail. It will also examine whether trends in nonfirearm homicide, as well as firearm homicide, have differed between the three countries.

The relationship of economic variables to the incidence of violent crime merits further scrutiny. Although the three countries in this study have experienced similar levels of economic growth as indexed by measures such as gross domestic product (GDP), their comparative experiences of socioeconomic disadvantage have not been explored. Although overall economic stability and growth may have contributed to the observed declines in firearm homicides in each country, it is increasingly recognized that there are inequalities in the distribution of wealth within individual countries, evidenced by the elevated risk of social disadvantage faced by certain groups in the community (e.g., unemployed young people, persons with substance abuse or mental health issues). In this regard, broad measures such as GDP may not provide a suitably nuanced reflection of social well-being and/or injury mortality (Nasrullah, Laflamme, & Khan, 2008).

The majority of firearms used to commit homicide in Canada and Australia are not legally owned. More than 80% of firearm homicides in Canada (Dauvergne & De Socio, 2008) and more than 90% of firearm homicides in Australia (Davies & Mouzos, 2007; Mouzos & Houliaris, 2006) are committed by persons using illicitly owned firearms. Data on the licensing status of homicide offenders could not be obtained for New Zealand; however, the Australian and Canadian observations may indicate dissociation between firearm violence and legislative approaches to firearms ownership, whereby legislative reform does not influence the population of individuals who commit firearm violence. Thus, broader changes in social policy and crime prevention policies may explain the declines in firearm homicide.

For example, it has been suggested that in at least one Australian state (New South Wales), firearm homicides are linked with the illicit drug trade (Fitzgerald, Briscoe, & Weatherburn, 2001). Recent declines in firearm homicide in that state coincided with a heroin "shortage," which has also been associated with declines in property crime (Degenhart, Conroy, Gilmour, & Collins, 2005). Similar relationships between the illicit drug trade and firearm homicide have been found in Canada, and recent spikes in the rate of Canadian firearm homicide have been linked with gang- and drug-related activity involving young men from socially disadvantaged backgrounds (Royal Canadian Mounted Police, 2006). Though specific information on urban disadvantage and firearm crime was not available for New Zealand, broadly consistent findings have emerged regarding youth involvement with deviant peer groups, illicit substance use, and violent crime in general (Fergusson, Swain-Campbell, & Horwood, 2002).

In both Australia and Canada, it has been found that firearm homicides, though rare, occur disproportionately in urban crime "hotspots" (Fitzgerald et al., 2001; Royal Canadian Mounted Police, 2006; Williams & Poynton,

2006). This begs the question of how the firearms used in such homicides are obtained. Recent Australian research has assessed the possibility that theft from legal owners is where homicide perpetrators illicitly acquired their firearm. However, over a 3-year study period, it emerged that only two stolen firearms were linked with homicide (Bricknell, 2008a). One was a handgun stolen from a security guard (Bricknell, 2008b), and the source and type of the second firearm was not specified (Bricknell, 2008a). This suggests a role for alternative methods of acquisition, aside from theft, although it is not clear how the three countries of interest vary in this regard and how different methods of illicit firearms acquisition may relate to the incidence of firearm homicide.

Connections between the illicit drug trade, other illicit activities, and socioeconomic disadvantage, offer a useful conceptual framework for understanding both the occurrence of firearm homicide and the prevalence of illicit firearms use in homicide incidents. In recognition of the connection between illicit firearms use and other illicit activities, Australian crime prevention has increasingly focused on disrupting organized criminal networks that are involved with the illicit drug trade (e.g., "Task Force Gain," Parliament of New South Wales, 2004).

In addition, community policing, community involvement, and partnerships between communities and all levels of government have received growing recognition as important tools in reducing criminal activity (Armstrong, Francis, & Totikidis, 2005; Cherney & Sutton, 2007; Ellison, 2006). Canada has, in recent years, adopted a similar approach (e.g., Alberta Government, 2007; Mann, Senn, Girard, & Ackbar, 2007; National Crime Prevention Center [NCPC], 2008). Long-term monitoring of violence in areas of urban disadvantage may elucidate whether community-oriented partnerships and prevention efforts have an influence on firearm (and, indeed, nonfirearm) homicide rates, above and beyond the influence of broader social and economic factors. This is a direction for future study.

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Notes

1. For years or cases where only one type of information was available, population counts were used in conjunction with the one available data type, to calculate the second type of data.

2. Alternate specification results: Australia versus New Zealand Ratio (95% confidence interval [CI]) = 1.0397 (1.0148-1.0653), $p = .002$; Canada versus New Zealand Ratio (95% CI) = 1.0797 (1.0556-1.1044), $p < .001$.

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