SPECIAL ARTICLE

HANDGUN REGULATIONS, CRIME, ASSAULTS, AND HOMICIDE

A Tale of Two Cities

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Abstract To investigate the associations among handgun regulations, assault and other crimes, and homicide, we studied robberies, burglaries, assaults, and homicides in Seattle, Washington, and Vancouver, British Columbia, from 1980 through 1986.

Although similar to Seattle in many ways, Vancouver has adopted a more restrictive approach to the regulation of handguns. During the study period, both cities had similar rates of burglary and robbery. In Seattle, the annual rate of assault was modestly higher than that in Vancouver (simple assault: relative risk, 1.18; 95 percent confidence interval, 1.15 to 1.20; aggravated assault: relative risk, 1.16; 95 percent confidence interval, 1.12 to 1.19). However, the rate of assaults involving firearms was seven times higher in Seattle than in Vancouver. Despite similar overall rates of criminal activity and assault, the relative risk of death from homicide, adjusted for age and sex, was significantly higher in Seattle than in Vancouver (relative risk, 1.63; 95 percent confidence interval, 1.28 to 2.08). Virtually all of this excess risk was explained by a 4.8-fold higher risk of being murdered with a handgun in Seattle as compared with Vancouver. Rates of homicide by means other than guns were not substantially different in the two study communities.

We conclude that restricting access to handguns may reduce the rate of homicide in a community. (N Engl J Med 1988; 319:1256-62.)

APPROXIMATELY 20,000 persons are murdered in the United States each year, making homicide the 11th leading cause of death and the 6th leading cause of the loss of potential years of life before age 65.[1-3] In the United States between 1960 and 1980, the death rate from homicide by means other than firearms increased by 85 percent. In contrast, the death rate from homicide by firearms during this same period increased by 160 percent.[3]

Approximately 60 percent of homicides each year involve firearms. Handguns alone account for three fourths of all gun-related homicides.[4] Most homicides occur as a result of assaults during arguments or altercations; a minority occur during the commission of a robbery or other felony.[2,4] Baker has noted that in cases of assault, people tend to reach for weapons that are readily available.[5] Since attacks with guns more often end in death than attacks with knives, and since handguns are disproportionately involved in intentional shootings, some have argued that restricting access to handguns could substantially reduce our annual rate of homicide.[5-7]

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To support this view, advocates of handgun control frequently cite data from countries like Great Britain and Japan, where the rates of both handgun ownership and homicide are substantially lower than those in the United States.[8] Rates of injury due to assault in Denmark are comparable to those in northeastern Ohio, but the Danish rate of homicide is only one fifth as high as Ohio's.[5,6] In Denmark, the private ownership of guns is permitted only for hunting, and access to handguns is tightly restricted.[6]

Opponents of gun control counter with statistics from Israel and Switzerland, where the rates of gun ownership are high but homicides are relatively uncommon.[9] However, the value of comparing data from different countries to support or refute the effectiveness of gun control is severely compromised by the large number of potentially confounding social, behavioral, and economic factors that characterize large national groups. To date, no study has been able to separate the effects of handgun control from differences among populations in terms of socioeconomic status, aggressive behavior, violent crime, and other factors.[7] To clarify the relation between firearm regulations and community rates of homicide, we studied two large cities in the Pacific Northwest: Seattle, Washington, and Vancouver, British Columbia. Although similar in many ways, these two cities have taken decidedly different approaches to handgun control.

METHODS

Study Sites

Seattle and Vancouver are large port cities in the Pacific Northwest. Although on opposite sides of an international border, they are only 140 miles apart, a three-hour drive by freeway. They share a common geography, climate, and history. Citizens in both cities have attained comparable levels of schooling and have almost iden-

tical rates of unemployment. When adjusted to U.S. dollars, the median annual income of a household in Vancouver exceeds that in Seattle by less than $500. Similar percentages of households in both cities have incomes of less than $10,000 (U.S.) annually. Both cities have large white majorities. However, Vancouver has a larger Asian population, whereas Seattle has larger black and Hispanic minorities (Table 1).[10,11] The two communities also share many cultural values and interests. Six of the top nine network television programs in Seattle are among the nine most watched programs in Vancouver.[12,13]

Firearm Regulations

Although similar in many ways, Seattle and Vancouver differ markedly in their approaches to the regulation of firearms (Table 2). In Seattle, handguns may be purchased legally for self-defense in the street or at home. After a 30-day waiting period, a permit can be obtained to carry a handgun as a concealed weapon. The recreational use of handguns is minimally restricted.[15]

In Vancouver, self-defense is not considered a valid or legal reason to purchase a handgun. Concealed weapons are not permitted. Recreational uses of handguns (such as target shooting and collecting) are regulated by the province, and the purchase of a handgun requires a restricted-weapons permit. A permit to carry a weapon must also be obtained in order to transport a handgun, and these weapons can be discharged only at a licensed shooting club. Handguns can be transported by car, but only if they are stored in the trunk in a locked box.[16,17]

Although they differ in their approach to firearm regulations, both cities aggressively enforce existing gun laws and regulations, and convictions for gun-related offenses carry similar penalties. For example, the commission of a class A felony (such as murder or robbery) with a firearm in Washington State adds a minimum of two years of confinement to the sentence for the felony.[18] In the Province of British Columbia, the same offense generally results in 1 to 14 years of imprisonment in addition to the felony sentence.[16] Similar percentages of homicides in both communities eventually lead to arrest and police charges. In Washington, under the Sentencing Reform Act of 1981, murder in the first degree carries a minimum sentence of 20 years of confinement.[19] In British Columbia, first-degree murder carries a minimum sentence of 25 years, with a possible judicial parole review after 15 years.[20] Capital punishment was abolished in Canada during the 1970s.[21] In Washington State, the death penalty may be invoked in cases of aggravated first-degree murder, but no one has been executed since 1963.

Rates of Gun Ownership

Because direct surveys of firearm ownership in Seattle and Vancouver have never been conducted, we assessed the rates of gun ownership indirectly by two independent methods. First, we obtained from the Firearm Permit Office of the Vancouver police department a count of the restricted-weapons permits issued in Vancouver between March 1984 and March 1988 and compared this figure with the total number of concealed-weapons permits issued in Seattle during the same period, obtained from the Office of Business and Profession Administration, Department of Licensing, State of Washington. Second, we used Cook's gun prevalence index, a previously validated measure of intercity differences in the prevalence of gun ownership.[14] This index is based on data from 49 cities in the United States and correlates each city's rates of suicide and assaultive homicide involving firearms with survey-based estimates of gun ownership in each city. Both methods indicate that firearms are far more commonly owned in Seattle than in Vancouver (Table 2).

Identification and Definition of Cases

From police records, we identified all the cases of robbery, burglary, and assault (both simple and aggravated) and all the homicides that occurred in Seattle or Vancouver between January 1, 1980, and December 31, 1986. In defining cases, we followed the guidelines of the U.S. Federal Bureau of Investigation's uniform crime reports (UCR).[22] The UCR guidelines define aggravated assault as an unlawful attack by one person on another for the purpose of inflicting severe or aggravated bodily harm. Usually this type of assault involves the actual or threatened use of a deadly weapon. Simple assault is any case of assault that does not involve the threat or use of a deadly weapon or result in serious or aggravated injuries.

A homicide was defined as the willful killing of one human being by another. This category included cases of premeditated murder, intentional killing, and aggravated assault resulting in death. "Justifiable homicide," as defined by the UCR guidelines, was limited to cases of the killing of a felon by a law-enforcement officer in the line of duty or the killing of a felon by a private citizen during the commission of a felony.[22] Homicides that the police, the prosecuting attorney, or both thought were committed in self-defense were also identified and noted separately.

Table 1. Socioeconomic Characteristics and Racial and Ethnic Composition of the Populations in Seattle and Vancouver.

INDEX	SEATTLE	VANCOUVER
1980 Population	493,846	415,220
1985–1986 Population estimate	491,400	430,826
Unemployment rate (%)	5.8	6.0
High-school graduates (%)	79.0	66.0
Median household income (U.S. dollars)	16,254	16,681
Households with incomes ≤$10,000 (U.S.) (%)	30.6	28.9
Ethnic and racial groups (%)		
White (non-Hispanic)	79.2	75.6
Asian	7.4	22.1
Black	9.5	0.3
Hispanic	2.6	0.5
Native North American	1.3	1.5

Statistical Analysis

From both Seattle and Vancouver, we obtained annual and cumulative data on the rates of aggravated assault, simple assault, robbery, and burglary. Cases of aggravated assault were categorized according to the weapon used. Data on homicides were obtained from the files of the medical examiner or coroner in each community and were supplemented by police case files. Each homicide was further categorized according to the age, sex, and race or ethnic group of the victim, as well as the weapon used.

Population-based rates of simple assault, aggravated assault, robbery, burglary, and homicide were then calculated and compared. These rates are expressed as the number per 100,000 persons per year and, when possible, are further adjusted for any differences in the age and sex of the victims. Unadjusted estimates of relative risk and 95 percent confidence intervals were calculated with use of the maximum-likelihood method and are based on Seattle's rate relative to Vancouver's.[23] Age-adjusted relative risks were estimated with use of the Mantel–Haenszel summary odds ratio.[24]

RESULTS

During the seven-year study period, the annual rate of robbery in Seattle was found to be only slightly higher than that in Vancouver (relative risk, 1.09; 95 percent confidence interval, 1.08 to 1.12). Burglaries, on the other hand, occurred at nearly identical rates in the two communities (relative risk, 0.99; 95 percent confidence interval, 0.98 to 1.00). During the study period, 18,925 cases of aggravated assault were reported in Seattle, as compared with 12,034 cases in Vancouver. When the annual rates of assault in the two cities were compared for each year of the study, we found that the two communities had similar rates of assault during the first four years of the study. In

Table 2. Regulation and Ownership of Firearms and Law-Enforcement Activity in Seattle and Vancouver.

	SEATTLE	VANCOUVER
Regulations		
Handguns	Concealed-weapons permit is required to carry a gun for self-defense on the street; none is required for self-defense in the home. Registration of handguns is not mandatory for private sales.	Restricted-weapons permit is required for sporting and collecting purposes. Self-defense in the home or street is not legally recognized as a reason for possession of a handgun. Handguns must be registered.
Long guns (rifles, shotguns)	Long guns are not registered.	Firearm-acquisition certificate is required for purchase. Long guns are not registered.
Law enforcement and sentencing		
Additional sentence for commission of a class A felony with a firearm	Minimum of 2 extra years.	1 to 14 extra years.
Percent of firearm-related homicides that result in police charges (police estimate)	80 to 90%	80 to 90%
Minimum jail sentence for first-degree murder	20 years in prison.	25 years in prison (parole is possible after 15 years).
Status of capital punishment	Legal, though no one has been executed since 1963.	Abolished.
Prevalence of weapons		
Total concealed-weapons permits issued (March 1984 to March 1988)	15,289	—
Total restricted-weapons permits issued (March 1984 to March 1988)	—	4137
Cook's gun prevalence index[14]	41%	12%

1984, however, reported rates of simple and aggravated assault began to climb sharply in Seattle, whereas the rates of simple and aggravated assault remained relatively constant in Vancouver (Fig. 1). This change coincided with the enactment that year of the Domestic Violence Protection Act by the Washington State legislature. Among other provisions, this law required changes in reporting and arrests in cases of domestic violence.[25] It is widely believed that this law and the considerable media attention that followed its passage resulted in dramatic increases in the number of incidents reported and in related enforcement costs in Seattle.[26] Because in Vancouver there was no similar legislative initiative requiring police to change their reporting methods, we restricted our comparison of the data on assaults to the first four years of our study (1980 through 1983) (Fig. 1).

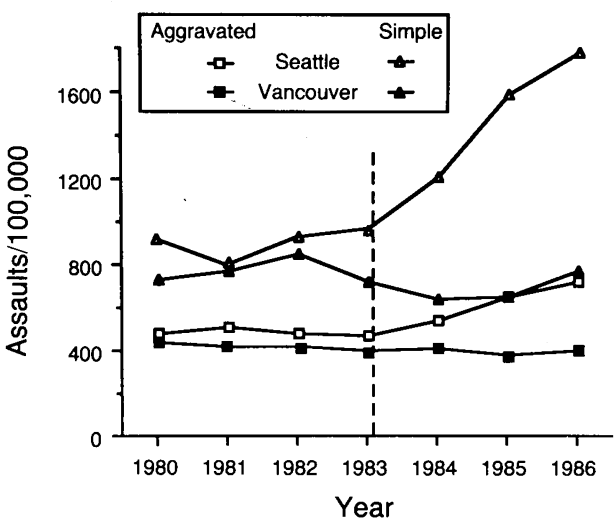

Figure 1. Rates of Aggravated and Simple Assault in Seattle and Vancouver, 1980 through 1986.
The dotted line indicates the passage of the Domestic Violence Protection Act in Washington State in 1984.

During this four-year period, the risk of being a victim of simple assault in Seattle was found to be only slightly higher than that in Vancouver (relative risk, 1.18; 95 percent confidence interval, 1.15 to 1.20). The risk of aggravated assault in Seattle was also only slightly higher than in Vancouver (relative risk, 1.16; 95 percent confidence interval, 1.12 to 1.19). However, when aggravated assaults were subdivided by the type of weapon used and the mechanism of assault, a striking pattern emerged. Although both cities reported almost identical rates of aggravated assault involving knives, other dangerous weapons, or hands, fists, and feet, firearms were far more likely to have been used in cases of assault in Seattle than in Vancouver (Table 3). In fact, all the difference in the relative risk of aggravated assault between these two communities was due to Seattle's 7.7-fold higher rate of assaults involving firearms (Fig. 2).

Over the whole seven-year study period, 388 homicides occurred in Seattle (11.3 per 100,000 person-years). In Vancouver, 204 homicides occurred during the same period (6.9 per 100,000 person-years). After adjustment for differences in age and sex between the populations, the relative risk of being a victim of homicide in Seattle, as compared with Vancouver, was found to be 1.63 (95 percent confidence interval, 1.28 to 2.08). This difference is highly unlikely to have occurred by chance.

When homicides were subdivided by the mechanism of death, the rate of homicide by knives and other weapons (excluding firearms) in Seattle was found to be almost identical to that in Vancouver (relative risk, 1.08; 95 percent confidence interval, 0.89 to 1.32) (Fig. 3). Virtually all of the increased risk of

Table 3. Annual Crude Rates and Relative Risks of Aggravated Assault, Simple Assault, Robbery, Burglary, and Homicide in Seattle and Vancouver, 1980 through 1986.*

Crime	Period	Seattle	Vancouver	Relative Risk	95% CI
		no./100,000			
Robbery	1980–1986	492.2	450.9	1.09	1.08–1.12
Burglary	1980–1986	2952.7	2985.7	0.99	0.98–1.00
Simple assault	1980–1983	902	767.7	1.18	1.15–1.20
Aggravated assault	1980–1983	486.5	420.5	1.16	1.12–1.19
Firearms		87.9	11.4	7.70	6.70–8.70
Knives		78.1	78.9	0.99	0.92–1.07
Other		320.6	330.2	0.97	0.94–1.01
Homicides	1980–1986	11.3	6.9	1.63	1.38–1.93
Firearms		4.8	1.0	5.08	3.54–7.27
Knives		3.1	3.5	0.90	0.69–1.18
Other		3.4	2.5	1.33	0.99–1.78

*CI denotes confidence interval. The "crude rate" for these crimes is the number of events occurring in a given population over a given time period. The relative risks shown are for Seattle in relation to Vancouver.

death from homicide in Seattle was due to a more than fivefold higher rate of homicide by firearms (Table 3). Handguns, which accounted for roughly 85 percent of the homicides involving firearms in both communities, were 4.8 times more likely to be used in homicides in Seattle than in Vancouver.

To test the hypothesis that the higher rates of homicide in Seattle might be due to more frequent use of firearms for self-protection, we examined all the homicides in both cities that were ruled "legally justifiable" or were determined to have been committed in self-defense. Thirty-two such homicides occurred during the study period, 11 of which involved police intervention. After the exclusion of justifiable homicide by police, 21 cases of homicide by civilians acting in self-defense or in other legally justifiable ways remained, 17 of which occurred in Seattle and 4 of which occurred in Vancouver (relative risk, 3.64; 95 percent confidence interval, 1.32 to 10.06). Thirteen of these cases (all of which occurred in Seattle) involved firearms. The exclusion of all 21 cases (which accounted for less than 4 percent of the homicides during the study interval) had little overall effect on the relative risk of homicide in the two communities (age- and sex-adjusted relative risk, 1.57; 95 percent confidence interval, 1.22 to 2.01).

When homicides were stratified by the race or ethnic group of the victim, a complex picture emerged (Table 4). The homicide rates in Table 4 were adjusted for age to match the 1980 U.S. population. This technique permits fairer comparisons among racial and ethnic groups with differing age compositions in each city. The relative risk for each racial or ethnic group, however, was estimated with use of the Mantel–Haenszel summary odds ratio.[24] This method, in effect, uses a different set of weights for the various age strata, depending on the distribution of persons among the age strata for that racial or ethnic group only. Hence, these estimates of relative risk differ slightly from a simple quotient of the age-adjusted rates.

Whereas similar rates of death by homicide were noted for whites in both cities, Asians in Seattle had higher rates of death by homicide than their counterparts in Vancouver. This difference persisted even after the exclusion of the 13 persons who died in the Wah Mee gambling club massacre in Seattle in 1983. Blacks and Hispanics in Seattle had higher relative risks of death by homicide than blacks and Hispanics in Vancouver, but the confidence intervals were very wide, given the relatively small size of both minorities in Vancouver. Only one black and one Hispanic were killed in Vancouver during the study period. Native Americans had the highest rates of death by homicide in both cities.

Discussion

Previous studies of the effectiveness of gun control have generally compared rates of homicide in nations with different approaches to the regulation of firearms.[7] Unfortunately, the validity of these studies has been compromised by the large number of confounding factors that characterize national groups. We sought to circumvent this limitation by focusing our analysis on two demographically comparable and physically proximate cities with markedly different approaches to handgun control. In many ways, these two cities have more in common with each other than they do with other major cities in their respective countries. For example, Seattle's homicide rate is consistently half to two thirds that reported in cities such as Chicago, Los Angeles, New York, and Houston,[4] whereas Vancouver experiences annual rates of homicide two to three times higher than those reported in Ottawa, Toronto, and Calgary (Canadian Centre for Justice Statistics, Homicide Program, Ottawa: unpublished data).

In order to exclude the possibility that Seattle's higher homicide rate may be explained by higher levels of criminal activity or aggressiveness in its popu-

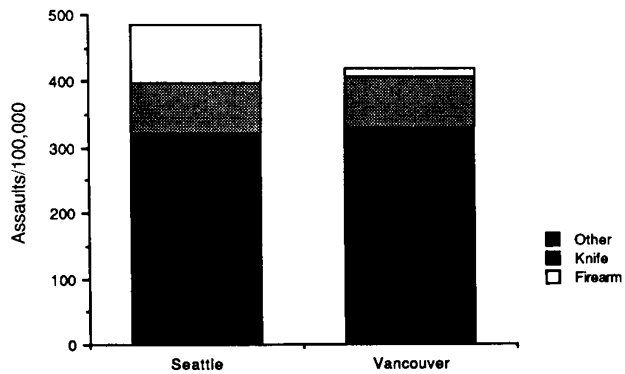

Figure 2. Annual Rates of Aggravated Assault in Seattle and Vancouver, 1980 through 1983, According to the Weapon Used. "Other" includes blunt instruments, other dangerous weapons, and hands, fists, and feet.

lation, we compared the rates of burglary, robbery, simple assault, and aggravated assault in the two communities. Although we observed a slightly higher rate of simple and aggravated assault in Seattle, these differences were relatively small — the rates in Seattle were 16 to 18 percent higher than those reported in Vancouver during a period of comparable case reporting. Virtually all of the excess risk of aggravated assault in Seattle was explained by a sevenfold higher rate of assaults involving firearms. Despite similar rates of robbery and burglary and only small differences in the rates of simple and aggravated assault, we found that Seattle had substantially higher rates of homicide than Vancouver. Most of the excess mortality was due to an almost fivefold higher rate of murders with handguns in Seattle.

Critics of handgun control have long claimed that limiting access to guns will have little effect on the rates of homicide, because persons who are intent on killing others will only work harder to acquire a gun or will kill by other means.[7,27] If the rate of homicide in a community were influenced more by the strength of intent than by the availability of weapons, we might have expected the rate of homicides with weapons other than guns to have been higher in Vancouver than in Seattle, in direct proportion to any decrease in Vancouver's rate of firearm homicides. This was not the case. During the study interval, Vancouver's rate of homicides with weapons other than guns was not significantly higher than that in Seattle, suggesting that few would-be assailants switched to homicide by other methods.

Ready access to handguns has been advocated by some as an important way to provide law-abiding citizens with an effective means to defend themselves.[27-29] Were this true, we might have expected that much of Seattle's excess rate of homicides, as compared with Vancouver's, would have been explained by a higher rate of justifiable homicides and killings in self-defense by civilians. Although such homicides did occur at a significantly higher rate in Seattle than in Vancouver, these cases accounted for less than 4 percent of the homicides in both cities during the study period. When we excluded cases of justifiable homicide or killings in self-defense by civilians from our calculation of relative risk, our results were almost the same.

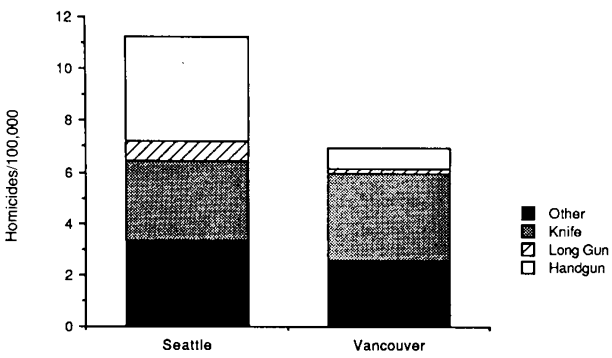

Figure 3. Annual Rates of Homicide in Seattle and Vancouver, 1980 through 1986, According to the Weapon Used.
"Other" includes blunt instruments, other dangerous weapons, and hands, fists, and feet.

Table 4. Annual Age-Adjusted Homicide Rates and Relative Risks of Death by Homicide in Seattle and Vancouver, 1980 through 1986, According to the Race or Ethnic Group of the Victim.*

Race or Ethnic Group	Seattle	Vancouver	Relative Risk	95% CI
	no./100,000			
White (non-Hispanic)	6.2	6.4	1	0.8–1.2
Asian	15.0	4.1	3.5	2.1–5.7
Excluding Wah Mee murders	9.5	—	2.3	1.4–4.0
Black	36.6	9.5	2.8	0.4–20.4
Hispanic	26.9	7.9	5	0.7–34.3
Native American	64.9	71.3	0.9	0.5–1.5

*CI denotes confidence interval. The relative risks shown are for Seattle in relation to Vancouver.

It also appears unlikely that differences in law-enforcement activity accounted for the lower homicide rate in Vancouver. Suspected offenders are arrested and cases are cleared at similar rates in both cities. After arrest and conviction, similar crimes carry similar penalties in the courts in Seattle and Vancouver.

We found substantial differences in the risk of death by homicide according to race and ethnic group in both cities. In the United States, blacks and Hispanics are murdered at substantially higher rates than whites.[2] Although the great majority of homicides in the United States involve assailants of the same race or ethnic group, current evidence suggests that socioeconomic status plays a much greater role in explaining racial and ethnic differences in the rate of homicide than any intrinsic tendency toward violence.[2,30,31] For example, Centerwall has shown that when household crowding is taken into account, the rate of domestic homicide among blacks in Atlanta, Georgia, is no higher than that of whites living in similar conditions.[32] Likewise, a recent study of childhood homicide in Ohio found that once cases were stratified by socioeconomic status, there was little difference in race-specific rates of homicide involving children 5 to 14 years of age.[33]

Since low-income populations have higher rates of homicide, socioeconomic status is probably an important confounding factor in our comparison of the rates of homicide for racial and ethnic groups. Although the median income and the overall distribution of household incomes in Seattle and Vancouver are similar, the distribution of household incomes by racial and ethnic group may not be the same in Vancouver as in Seattle. For example, blacks in Vancouver had

a slightly higher mean income in 1981 than the rest of Vancouver's population (Statistics Canada, 1981 Census Custom Tabulation: unpublished data). In contrast, blacks in Seattle have a substantially lower median income than the rest of Seattle's population.[34] Thus, much of the excess risk of homicide among blacks in Seattle, as compared with blacks in Vancouver, may be explained by their lower socioeconomic status. If, on the other hand, more whites in Vancouver have low incomes than whites in Seattle, the higher risk of homicide expected in this low-income subset may push the rate of homicide among whites in Vancouver higher than that for whites in Seattle. Unfortunately, neither hypothesis can be tested in a quantitative fashion, since detailed information about household incomes according to race is not available for Vancouver.

Three limitations of our study warrant comment. First, our measures of the prevalence of firearm ownership may not precisely reflect the availability of guns in the two communities. Although the two measures we used were derived independently and are consistent with the expected effects of gun control, their validity as indicators of community rates of gun ownership has not been conclusively established. Cook's gun prevalence index has been shown to correlate with data derived from national surveys, but it has not been tested for accuracy in cities outside the United States. Comparisons of concealed-weapons permits in Seattle with restricted-weapons permits in Vancouver are probably of limited validity, since these counts do not include handguns obtained illegally. In fact, the comparison of permit data of this sort probably substantially underestimates the differences between the communities in the rate of handgun ownership, since only a fraction of the handguns in Seattle are purchased for use as concealed weapons, whereas all legal handgun purchases in Vancouver require a restricted-weapons permit. Still, these indirect estimates of gun ownership are consistent with one another, and both agree with prior reports that estimate the rate of handgun ownership in Canada to be about one fourth that in the United States.[35]

Second, although similar in many ways, Seattle and Vancouver may well differ in other aspects that could affect their rates of homicide. For example, differences in the degree of illegal drug-related activity, differences in the rate of illicit gun sales, or other, less readily apparent differences may confound the relation between firearm regulations and the rate of homicide. Although such differences may exist, striking socioeconomic similarities between the cities and the fact that they had similar rates of burglary, robbery, and both simple and aggravated assault during comparable reporting periods make such confounding less likely. Unfortunately, changes in the rules for reporting assault cases in Seattle, mandated by the State of Washington in 1984, precluded a valid comparison of the rates of simple and aggravated assault over the entire seven-year period.

Third, conclusions based on a comparison of two cities in the Pacific Northwest may not be generalizable to other urban areas in North America. Given the complex interaction of individual behavior, environment, and community factors in the pathogenesis of violent death, we cannot predict the precise impact that Canadian-style gun control might have in the United States. Even if such a major change in public policy were to take place, the current high rates of handgun ownership might blunt any effects of tougher handgun regulations for years to come.

Our analysis of the rates of homicide in these two largely similar cities suggests that the modest restriction of citizens' access to firearms (especially handguns) is associated with lower rates of homicide. This association does not appear to be explained by differences between the communities in aggressiveness, criminal behavior, or response to crime. Although our findings should be corroborated in other settings, our results suggest that a more restrictive approach to handgun control may decrease national homicide rates.

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MEDICAL INTELLIGENCE

LAW–MEDICINE NOTES

CANCER-CAUSING SUBSTANCES IN FOOD, DRUGS, AND COSMETICS

The *de Minimis* Rule versus the Delaney Clause

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EVERY calling, every profession, every common activity of people develops its maxims, its shorthand messages, imparting to later generations the hard-earned lessons of the past. These maxims are often designed to save time that would be wasted, or to avoid risks or dangers that our elders underwent to their peril. Legal systems, filled as they are with historical documentation and adherence to precedent, are replete with pithy maxims that every new law student learns by rote.

One of the most frequently cited maxims of the ancient common law is the *de minimis* rule, which is used to avoid the pointless examination of extremely minute differences or variations. The rule says: "*De minimis non curat lex,*" or "The law does not concern itself with trifles." An efficient legal system seeks to encourage smoothly functioning, reasonable discourse and effective, sensible regulation. The courts and the law-enforcement agencies try to avoid becoming overwhelmed by the insignificant, including the trifles or aggravations of personal dispute — a situation that can actually lead to injustices.

Applying the *de minimis* rule in court is usually a matter of judicial discretion, to save time at the trial level. Appeals to higher courts rarely involve disagreement at trial over such discretionary decisions. Therefore, it is unusual for a case of major importance to thousands of industrial concerns in the United States to turn on the application of this ancient doctrine. Yet that is just what occurred in litigation before the prestigious (and very busy) Federal Court of Appeals for the District of Columbia, probably the most influential court in the nation on federal regulatory issues except for the Supreme Court itself.

The litigation was brought against the Food and Drug Administration to prevent that agency from interpreting the Delaney clause[1] to allow the use of certain chemical dyes by the cosmetics industry. It was a case with obvious implications for the application of this much-debated clause to other cases involving food additives.[2]

The clause in question dates from legislation passed in 1958, at the height of what was called in Congress an era of virtual hysteria over the dangers of cancer.[2,3] Congressman James J. Delaney, a New York Democrat from Queens, proposed that the House of Representatives amend its version of the bill to prohibit the use of any color-additive substance in food intended for human consumption — if, after appropriate safety tests, the Secretary of Health, Education, and Welfare (now Health and Human Services) found the substance to induce cancer in humans or animals. The Senate accepted the Delaney clause and it became law.

Industries regulated by the FDA opposed the Delaney clause from the start. They ridiculed as scientific nonsense its extreme interpretation by Congressman Delaney, who said that it prevented the use of any substance for which animal testing produced any cancer in any animal species, no matter how remote the potential for cancer in humans.

Congressman Delaney was no scientist. He claimed no more than a layman's knowledge (and fear) of cancer and the causes of cancer in humans or animals.