Thore Karlsson,[1] M.D.; Bosse Isaksson[2]; and Kari Ormstad,[1] M.D., Ph.D.

Gunshot Fatalities in Stockholm, Sweden with Special Reference to the Use of Illegal Weapons

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ABSTRACT: During the years 1980–1992 the Swedish legislation regarding possession and use of firearms has remained fairly unchanged. Simultaneously the reported incidence of both stolen firearms and confiscation of illegally possessed handguns has increased significantly. In order to determine the impact of this trend on gunshot mortality, all victims of firearm fatalities subjected to medicolegal autopsy in the Stockholm area 1980–81 and 1990–91 were studied.

The overall two-year rate increased from 50 to 65, homicides and suicides contributing seven new cases each; accidents and "not determined" comprising only 0 to 2 cases in each period. Suicides were four times as common as homicides in the former period; ca. three times as common in the latter. Thus, a 70% increase in homicidal shooting has occurred (from 10 to 17), and the fatal use of illegal firearms increased from 50% to 93%.

As expected, there was a definite male dominance (96%) among perpetrators as well as among victims (85%). Concerning suicides, the rate in the latter period was 18% above that in the former; illegal guns were used in 30% in 1990–91 as compared to 20% 1980–81.

The pattern of wounding in suicides was similar to that reported in earlier studies; confirming that entrance wounds in the back, extremities and lower abdomen are indicative of homicide. Thus, common sense knowledge of firearm fatalities are confirmed:

- More widespread access to illegal weapons conveys a higher rate of gunshot fatalities.
- The perpetrator is likely to be male.
- Suicidal shots are usually aimed at the head (mouth, temple, forehead) or precordium.
- Most gunshot suicides are committed by means of legally possessed firearms.

KEYWORDS: criminalistics, gunshot fatalities, Sweden

Gunshot wounds and deaths due to gunshots are a major public health problem in North America. For a resident in Canada the statistical risk to die from a firearm discharge is almost as high as the likelihood to suffer a lethal motor vehicle accident [*1*]. Figures from the United States are even higher [*2*].

The overall mortality due to gunshots in Sweden is about 200 per year. The vast majority is suicides [*3*].

Despite its history of being one of the native lands of fierce viking warriors, Sweden has an incidence of gunshot fatalities amounting to a mere one-quarter of deaths due to

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[1]Department of Forensic Medicine, Karolinska Institutet, Stockholm, Sweden.
[2]Stockholm Police Department, Stockholm, Sweden.

traffic accidents. The overall mortality due to gunshots has been rather constant, about 200 deaths per year. The vast majority of firearms deaths is suicides, constituting about 15% of all suicides among males and 1% among females [*3*].

An alarming increase in both the presence and the usage of illegal guns has been noticed in recent years in Sweden law-enforcement agencies.

The aim of this study was to establish whether this change of pattern affects the spectrum and frequence of firearms fatalities. Furthermore gunshot deaths will be discussed in relation to studies of sharp force fatalities in the same area previously published in this journal [*4*,*5*].

Materials and Methods

All deaths due to gunshot wounds examined at the National Institute of Forensic Medicine in Stockholm 1980 to 81 and 1990 to 91 have been included in the study. The region served by this unit comprises the counties of Stockholm, Soerdermanland and Gotland; population approximately 1.800.000 in 1980 and 1.900.000 (+5,5%) in 1991. In addition to Stockholm city our region includes 22 towns and communities.

According to Swedish law medicolegal investigation is mandatory in all casualties due to homicide, suicide or accident. Thus very few cases, if any, of identified fatal gunshot wounds are likely to have been missed in this material. Data about gunshot fatalities were retrieved from the files of the National Institute of Forensic Medicine in Stockholm and information about weapons used was given by the local police departments. Statistical figures were obtained from the National Swedish Police Board and from the Statistics, Sweden.

Legal possession of a firearm in Sweden requires a personal license issued by police authorities. License for hunting rifles can be granted hunters after passing special training program. Firearms for target practice can be licensed after proof of good marksmanship and recommendation from a sanctioned rifle club. Few licenses (less than 5% [*6*]) are ever issued for handguns and virtually none for automatic weapons. The total number of legal, licenced, privately owned firearms in Sweden was 1988 estimated to 2,100,000 [*6*], which equals approximately one-quarter per capita.

Results

The incidence of reported violations against the Swedish "weapons law" (SFS 1973: 1176 [1991:1181]) regarding illegal possession of firearms is shown in Fig. 1. These are minimum numbers since simultaneous possession of several weapons is recorded as one single violation. The police authorities' data on illegal possession of rifles in Sweden is almost constant whereas the incidence of handguns (pistols, revolvers) is rising dramatically. The difference between 1980–85 (mean value 657 annually) and 1986–90 (m.v. 785) is statistically significant (P = 0,005).

The annual incidence of firearms reported as stolen in Sweden is shown in Fig. 2. A statistically significant increase (p = 0.005) has occurred from 1980–85 (m.v. 969 yearly) to 1986–91 (m.v. 1122). Handguns per se constitute a fairly constant number of about 200 per year; considerably less than the 700 to 800 illegally possessed handguns being confiscated each year (Fig. 1).

Characteristics of Victims

Table 1 depicts the relative representation of suicides, accidents and homicides among firearms fatalities in the Stockholm area.

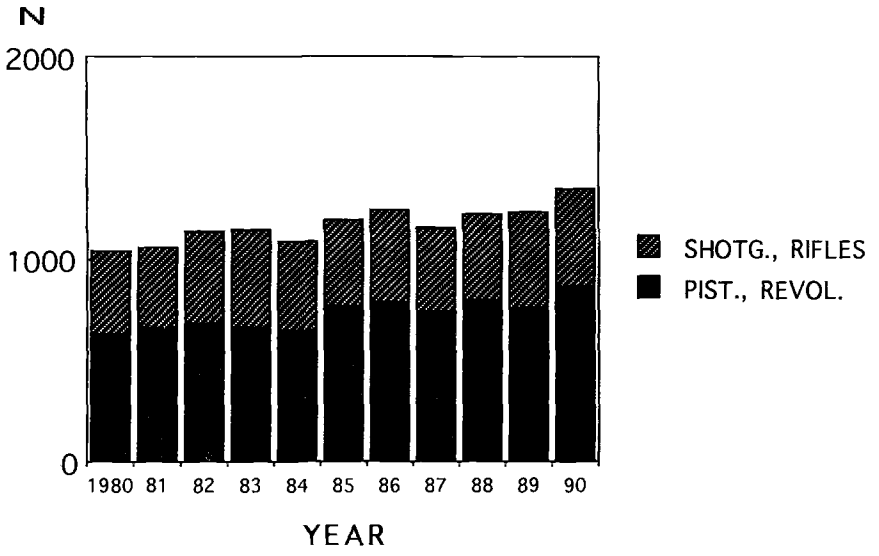

FIG. 1—*Reports of illegal firearm possession recorded by Swedish police (Personal communication Mr. Lillebror Ahlin, Statistics, Sweden).*

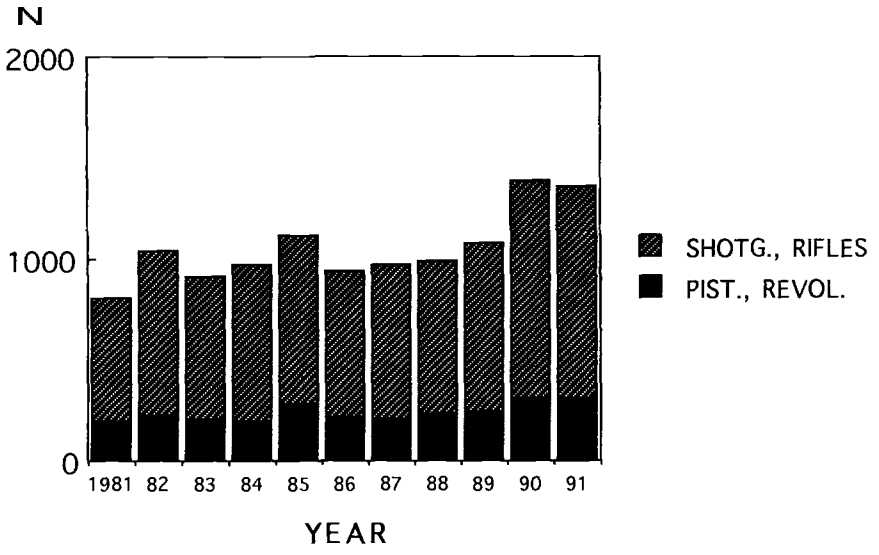

FIG. 2—*Reports of stolen firearms filed with Swedish police (personal communication Ms. Marja Kalajoki, National Swedish Police Board.*

TABLE 1—*Firearm fatalities in the Stockholm area 1980–81 and 1990–91.*

	Homicides N	Suicides N	Accidents N	Unknown N
1980	8	25	0	0
1981	2	14	0	1
Subtotal	10	39	0	1
1990	6	24	1	0
1991	11	22	1	0
Subtotal	17	46	2	0
Sum	27	85	2	1

Homicides

The number of homicides increased from 10, 1980 to 81 to 17, 1990 to 91. When counting perpetrators the increase is from 6 during the former period to 15 during the latter. Among 20 identified perpetrators in the entire material 19 (95%) were males. Among the 27 homicide victims 23 (85%) were males.

The age and sex distribution of victims is shown in Fig. 3. Of all 27 victims in the study 23 (85%) were evenly distributed in the age group 10 to 50 years.

A short description of the homicides is given in Table 2. Among six guns used 1980 to 81, three were illegally possessed compared to 14 of 15 identified firearms in 1990 to 91. The incidence of domestic firearm homicides was 5/10 in 1980 to 81 (all these guns were legally possessed) compared to 4/17 1990 to 91 (one of two used guns was

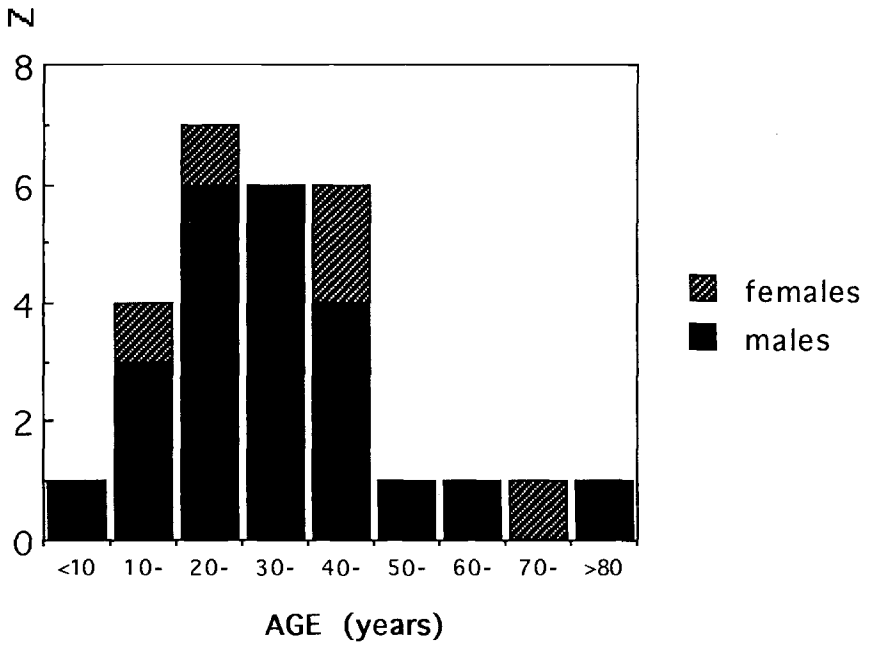

FIG. 3—*Age and sex distribution in victims of homicidal firearm violence in the Stockholm area 1980–81 and 1990–91 (pooled data).*

TABLE 2—*Brief account of firearm homicides in the Stockholm area 1980–81 and 1990–91.*

Victim Sex/age (years)	Perpetrator Sex/age (years)	Characteristics of incident
1980–81		
M / 34	F / 32	#A Spouses B Couple's home, alleged self defence C Victim's licenced shotgun
Twin M / 11,11 F / 15	M / 41	A Father-children B Family's home, extended suicide C Perpetrator's licenced shotgun
M,M / 32, 35 F / 25	M / 22	A Acquainted B Temporary residence C Perpetrator's illegal 7.65 mm pistol
M / 23	M / 25	A Acquainted B Victim's home C Perpetrator's illegal 7.65 mm pistol
F / 41	M / 44	A Spouses B Family's home, jealousy C Perpetrator's licensed cal 222. rifle
M / 31	M / 31	A Not acquainted B Street (fight) C Perpetrator's illegal 6.35 mm pistol
1990–91		
M / 40	M / 32	A Acquainted B Rented barn C Perpetrator's illegal cal 22. revolver
M / 28	M / 29	A Acquainted B Temporary residence C Perpetrator's illegal shotgun
M / 10, 8	M / 42	A Father-sons B Family's home, extended suicide C Perpetrator's licenced 7,62 mm rifle
M / 87 F / 45	M / 22	A Perpetrator-mother and grandfather B Victims's homes (two venues) C Perpetrator's illegal shotgun (stolen)
M / 27	M / 22	A Acquainted B Victim's home C Perpetrator's illegal revolver
M / 61	M / 17	A Not acquainted B Motorway C Perpetrator's illegal pistol
M / 44	M / 33	A Acquainted B 3rd persons home, fight over money C Victim's illegal shotgun used by a friend of his who by accident killed the wrong person
M / 51	M / Unknown	A Shop-owner killed B during robbery C Perpetrator's illegal shotgun
M / 34	? / Unknown	A Not acquainted B Street C Small caliber arm
M / 48	M / 19	A Shop-owner killed B during robbery C Perpetrator's illegal cal 22. revolver
M / 31	M / 41	A Acquainted B In the doorway of the victim's flat C Perpetrator's illegal shotgun
M / 20	M / Unknown	A Acquainted? B Street C Perpetrator's illegal 7,65 mm pistol

TABLE 2—*Continued.*

Victim Sex/age (years)	Perpetrator Sex/age (years)	Characteristics of incident
M / 22	M / 21	A Acquainted B Victim's fiancé's home C Perpetrator's illegal shotgun
M / 41	M / 43	A Acquainted B Victim's home C Perpetrator's illegal shotgun
M / 23	M / 27	A Watchman killed B during robbery C Perpetrator''s illegal cal. .22 pistol

NOTE: A = Relation victim/perpetrator
B = Setting
CC = type of weapon, Illegal = illegally possessed, that is used by someone not licensed.

legal). Victim and perpetrator were strangers in 1 of 10 homicides 1980 to 81 compared to 5/17 in the latter period.

Suicides

The incidence of suicides was rather uniform in the two periods studied (see Table 1) and the male/female ratio was 84/1 (99% males). Age and sex distribution is shown in Fig. 4.

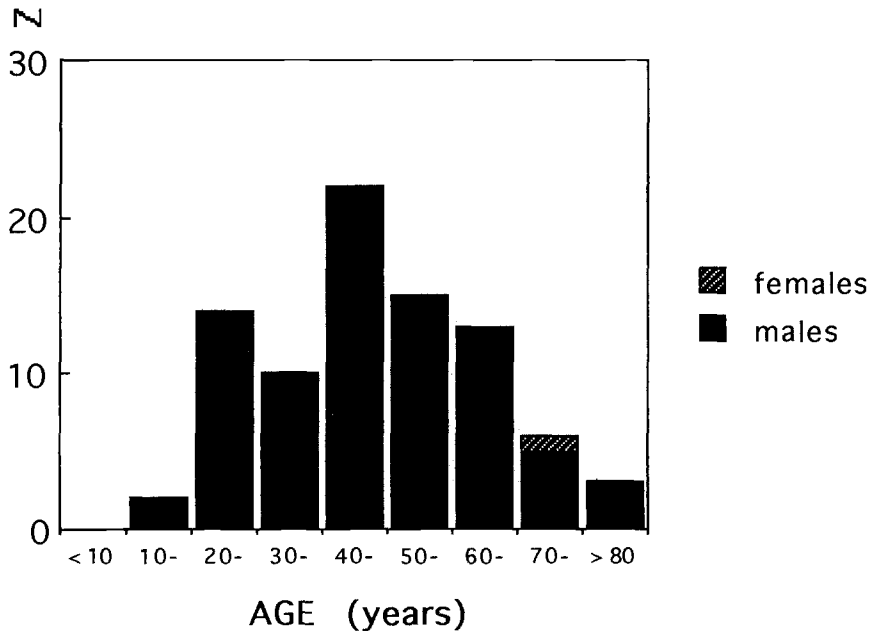

FIG. 4—*Age and sex distribution in victims of suicidal firearm violence in the Stockholm area 1980–81 and 1990–91 (pooled data).*

In 1980 to 81 11 of 39 (27%) suicide victims were single and unmarried, in 1990 to 91 this figure was almost doubled to 22 of 46 (47%).

Types of weapons used are shown in Table 3. In 15 of 85 cases (17%) service weapons were used; nine of those men were enlisted military men or police officers, four were members of the home guard allowed to keep their guns at home; only two were draftees.

Seasonal Variation (Fig. 5)

In the Stockholm area rates of firearm-related suicides peak in early spring (March) and late summer (August) whereas homicides peak in mid-summer.

Patterns of Wounding

Table 4 lists localizations of entrance wounds. In two cases of suicide two shots were fired; in the first of these cases a sub-machine gun was used and in the second a small caliber (cal. .22) rifle. In suicides 74 of 87 wounds (85%) were located in the head, the same figure for homicides was 17/41 (40%). All suicidal shots not aimed at the head were directed at the anterior aspect of the chest. Entrance wounds in the back, facial skin, eye or extremities did not occur in suicides.

Time of Survival

In an absolute majority of cases, regardless of which anatomical structures were injured, the findings at the venue in combination with the results of the postmortem showed that the deceased had remained unconscious from being shot until death and probably had expired more or less immediately. When regarding shots directed at the head 5 of 94 persons (5%) survived long enough to receive medical care. The same figure regarding shots directed at the chest was 4 of 27 (15%).

TABLE 3—*Weapons used for suicidal shooting (numbers in parentheses = illegally possessed).*

	Shotguns	Hunting rifles >cal. .22	Service arms	Small rifles cal. .22	Pistols	Revolvers
1980–81[a]	8 + (3)	7	9	3 + (2)	2 + (1)	2 + (2)
1990–91[b]	11 + (4)	7	6	(1)	8 + (3)	1 + (5)
Sum	19 + (7)	14	15	3 + (3)	10 + (4)	3 + (7)

[a]Among 9 service arms five were 9 mm (cal. .38) army pistols (m/40 and m/07), one Walther PP 7,65 mm (cal. .32), one military sub-machine gun (m/45B), one sniper's rifle (m/41B) and one assault rifle (Ak 4).

Among civil pistols calibers were 6,35 mm (cal. .25), 7,65 mm, 9 mm.

Among civil revolvers: two cal. .22, one 9 mm and one antique 9 mm(?) made earlier than 1860.

[b]Among 6 service arms three were assault rifles (Ak 4), two 9 mm army pistols (m/40) and one sub-machinegun (m/45B).

Among civil pistols calibers were cal. .44, .357 Mag., three 9 mm, one 7,65 mm, two 6,35 mm and three cal. .22.

Among civil revolvers: one cal. 44, one .38, one .32, one 6 mm and two cal. .22.

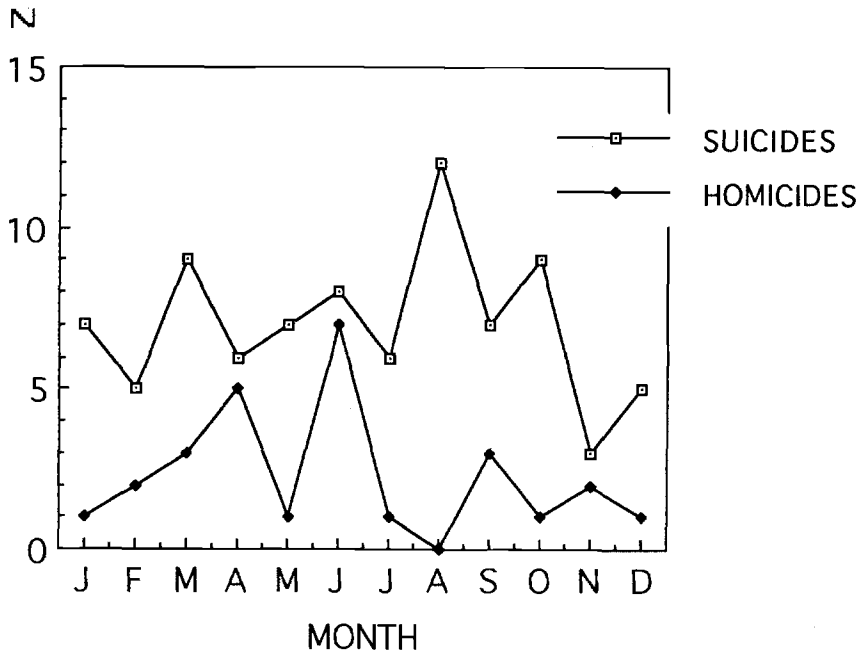

FIG. 5—*Monthly incidence of firearm-related suicides and homicides in the Stockholm area 1980–81 and 1990–91 (pooled data).*

TABLE 4—*Localization of entrance wound.*

	Suicides N	Homicides N	Accidents N	Unknown N
Mouth, palate	27	0		
Rt temple	23	3		1
Precordium	11	5		
Beneath chin	9	0		
Lt temple	6	2	1	
Middle of forehead	4	2		
Eye	0	4	1	
Facial skin	0	3		
Back	0	6		
Rt side of chest	0	5		
Abdomen	0	5		
Others				
lateral aspect of head	3	0		
throat	2	0		
posterior aspect of neck	1	1		
unknown (shattered head)	1	0		
extremity	0	3		
top of head	0	2		
Sum	87	41	2	1

TABLE 5—*Results of postmortem toxicological analyses in firearm casualties.*

Alcohol	Not performed	Negative	Positive (g/L blood)				
			0,1–0.5	0.5–1.5	1.5–3	3–4	>4
1980–81							
Suicides (n = 39)	12	18	0	4	5	0	0
Homicides (n = 10)	5	2	0	1	2	0	0
Open verdict (n = 1)	0	1	0	0	0	0	0
1990–91							
Suicides (n = 46)	0	29	2	5	8	1	1
Homicides (n = 17)	1	14	0	0	2	0	0
Accidents (n = 2)	1	1	0	0	0	0	0
Sum	19	65	2	10	17	1	1
Medicinal drugs							
1980–81							
Suicides (n = 39)	23	14	2				
Homicides (n = 10)	6	4	0				
Open verdict (n = 1)	0	1	0				
1990–91							
Suicides (n = 46)	0	37	9				
Homicides (n = 17)	1	14	2				
Accidents (n = 2)	1	1	0				
Sum	31	71	13				
Narcotics							
1980–81							
Suicides (n = 39)	38	1	0				
Homicides (n = 10)	10	0	0				
Open verdict (n = 1)	1	0	0				
1990–91							
Suicides (n = 46)	37	6	3				
Homicides (n = 17)	9	3	5				
Accidents (n = 2)	2	0	0				
Sum	97	10	8				

Toxicology

Results of postmortem toxicological analyses are shown in Table 5. Alcohol could be detected in 26/73 (36%) of suicides, in only two cases at a concentration exceeding 3 g/L. In 22 cases both blood and urine were analyzed, in 18 of which (82%) urinary alcohol concentration exceeded blood alcohol concentration to such an extent (>1,4:1) that death was ruled to have occurred during excretory phase.

In homicide victims alcohol was detected in 5/21 (23%) of those tested. Two of these victims died immediately and the concentration in urine exceeded that in blood to the above-mentioned extent.

Non-lethal levels of different medicinal drugs were detected in 11/62 (18%) of examined suicide cases; that is, bensodiazepines (five cases), analgesics (four cases) quinine (two cases) and caffeine. In homicides bensodiazepines and analgesics were detected in 2 of 20 (10%) examined victims. Amphetamine and cannabis were found in five of eight tested homicide victims 1990-91.

In this series only two casualties were judged to be accidental; the first of which occurred during children's play, the second when a motorist was hit by a stray machine gun bullet fired from a military riflerange approximately 1 km away. The case denoted "unknown" was a decomposed, still unidentified body found at sea.

Discussion

According to police records a significant increase in the numbers of stolen firearms as well as confiscated handguns has occurred in Sweden from 1980 to 1991. Furthermore, during the same period the incidence of firearm-related homicides in the Stockholm area rose from 10 to 17. In 1980–81 3/6 guns used for homicidal shootings were illegally possessed compared to 14/15 identified weapons in 1990 to 91. The incidence of domestic firearm homicides was 5/10 (50%) in 1980 to 81 compared to 4/17 (23%) 1990 to 91. On the other hand in 1990 to 91 several homicides occurred where victims and perpetrators were unknown to each other.

This increase in firearm-related homicides does not seem to be due to an overall increase in homicidal rate. Nation-wide statistics show rather uniform figures (Fig. 6) (data from later than 1989 are not yet available). Neither is the increase noted in our series statistically significant. In combination with the new different types of homicide (for example, during shoot-outs or armed robbery) 1990–91 and the increased use of illegal guns in homicides, we feel that the increased occurrence of illegal firearms has led to a certain rise in mortality and have caused casualties in situations where lack of access to such efficient weapons would only have ended in assault and battering.

It is also likely that an increase in numbers of non fatal firearm-related violence (armed robbery, threats) has occurred. Such incidents may prompt others to arm themselves and thus escalate the level of risk. Studies from the United States [7] have shown that the incidence of gunshot homicides parallels the number of new firearms available for sale. Sloan et al. [8] compared the higher incidence of firearm-related homicides in Seattle to lower figures in Vancouver where regulations of handgun possession are stricter. According to Loftin et al. [9] rates of homicidal as well as suicidal shooting decreased in Washington D.C. after the adoption of gun licensing law 1976.

Our study indicates that in a defined population with unchanged gun legislation, increasing incidence and a changed spectrum of homicides accompany a higher prevalence of illegal weapons. Thus, changes in the public readiness to obtain and possess firearms are also important. Of course, this is not to be regarded as a suggestion that adoption of gun licensing laws be less important. The present strict Swedish laws regarding firearms have probably saved numerous lives. Thus an influx of weapons from countries with

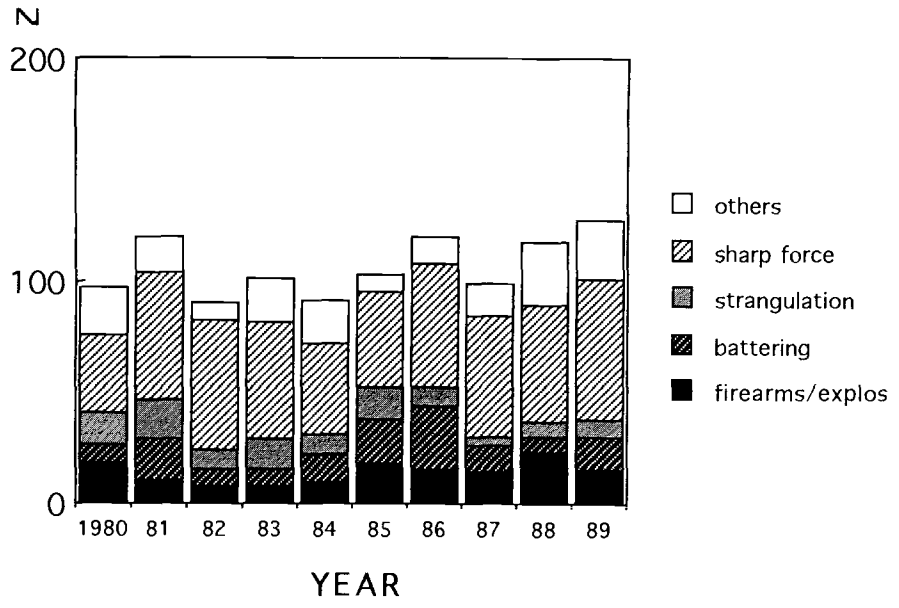

FIG. 6—*Modus in Swedish homicides 1980–89 (data compiled from [3]).*

few restrictions regarding trade and possession of firearms may lead to unwanted consequences. Only few guns having caused fatalities in this series could be traced to a legitimate owner. We look with apprehension to the future consequences the availability of firearms from the collapsing Eastern bloc may have in Western Europe.

Compared to our earlier study of homicidal sharp force [*4*] the relative male dominance among perpetrators was higher in this study; 96% compared to 80%. The same was to a lesser extent true concerning victims (85% versus 80%). The number of victims with blood alcohol levels above 0.3 g/L was lower in this study (20% compared to 80%). Victims' social relation to perpetrators, (family bonds etc), on the other hand, followed the same pattern. In both studies the parties were strangers in 20% of cases, in 30% they were intimately related.

Despite the 10-year interval between these studies we think that the overall setting when firearms are used in homicides is different from that pertaining to sharp force violence: With the possible exception of cases of domestic violence the use of firearms was more clearly intentional, guns were brought by perpetrators to the venue rather than—as when knives were concerned—mostly (62%) found and grabbed by chance at the scene. Use of alcohol was more a feature of sharp force violence than of firearm related fatalities. We feel that if firearms are to be more spread in Swedish society this kind of less intentional, unplanned shooting will become more common.

In suicides committed by means of firearms during the period 1980 to 81, 8 (20%) of 39 used guns were illegally possessed during. Ten years later 13 of 46 (30%) were illegal. The overall incidence of suicidal shooting is however only slightly increased.

The relatively high number of service guns used may partly be explained by tradition among service men to keep their personal weapons at home. This is for example prescribed to members of the Swedish home guard.

Compared to figures from the United States [*7*] the use of firearms in suicides is much less common in Sweden and when used only 35% are handguns compared to 65% in the U.S. Figures from rural Canada [*1*] show an even less frequent use of handguns

(6%). These differences may reflect variation in types and numbers of firearms available. One may presume a higher presence of rifles and shotguns in rural areas.

The male preponderance in firearms suicides was higher (99%) in this study than in reports from Canada (70%) [*10*]. Differences between sexes may, among other factors, be due to differences in social roles and traditions. Almost all males, but very few females undergo basic military training in Sweden, and there are relatively few female hunters.

The possibility to prevent firearms suicides by tight gun laws have been proposed by Snowdon and Harris [*11*]. This may also be relevant in Sweden since the majority of used guns were licenced. A recent study from Sweden [*6*] have demonstrated a significant correlation between number of licences issued and incidence of firearms-related suicides in different counties. Thus some lives may possibly be saved since according to Chapdelaine [*1*] the use of firearms seems to be the most "foolproof" among different ways to commit suicide. A more defaitistic view would be that a mature person determined to end his life would find a way even without access to firearms. Card [*12*] however, states that only 78% of those trying to commit suicide by hanging succeed; a surprisingly low figure.

The tendency among suicide victims to choose certain target areas (temple, mouth, heart, etc.) found in this study is well in line with the experience stated in older medicolegal textbooks [*13*] and seems to be a rather constant trait. In this study no homicide victim was shot in the mouth or beneath the chin, instead the face and in particular the eye were often wounded. Only in homicides the extremities were hit, in some cases possibly as a passive defence injury.

Compared to suicides committed by sharp force [*5*] the male predominance among firearm suicide victims is higher (99% vs. 76%). The incidence of blood alcohol levels above 0.3 g/L in victims was almost identical (approximately 35%). In a majority of cases in both series the level in urine was higher than in blood and the victim was about to be sobering up when the shot was fired.

Drugs were found only in 18% of cases in the present study compared to 39% among the sharp force suicides. The age distribution was almost identical with a peak around 40 to 49 years and rather few elderly. This is at variance with data from all suicides in Sweden taken together [*5*], and also differ from figures from the United States where males older than 75 years constitute a distinct high-risk group [*2*].

This study supports the assumption that "weapons create violence." Not only the guns as such are important, but also people's liability to arm themselves. Both homicidal and suicidal shooting show similarities to sharp force violence. Both methods are regarded in suicidology as "active."

Differences found among homicides could partly be explained by the much lower availability of firearms in Sweden. In a fight, knives instead of firearms are likely to be used. Still, when considering the much higher "lethality" with firearms this will save lives.

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Address requests for reprints or additional information to
Thore Karlsson, M.D.
Dept. of Forensic Medicine
Karolinska Institutet
S-104 01
Stockholm, Sweden