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Attorneys for Defendants
CITY AND COUNTY OF SAN FRANCISCO, et al.

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN FRANCISCO

UNLIMITED JURISDICTION

PAULA FISCAL, LARRY P. BARSETTI, REBECCA KIDDER, DANA DRENKOWSKI, JOHN CANDIDO, ALAN BYARD, ANDREW SIRKIS, NATIONAL RIFLE ASSOCIATION, SECOND AMENDMENT FOUNDATION, CALIFORNIA ASSOCIATION OF FIREARMS RETAILERS, LAW ENFORCEMENT ALLIANCE OF AMERICA, and SAN FRANCISCO VETERAN POLICE OFFICERS ASSOCIATION,

Plaintiffs and Petitioners,

vs.

CITY AND COUNTY OF SAN FRANCISCO, SAN FRANCISCO POLICE CHIEF HEATHER FONG in her official capacity and SAN FRANCISCO POLICE DEPARTMENT, and Does 1-25,

Defendants and Respondents.

Case No. 05-505960

DECLARATION OF VINCE CHHABRIA IN SUPPORT OF CITY'S OPPOSITION TO PETITION FOR WRIT OF MANDATE

Hearing Date:	February 15, 2006
Hearing Judge:	James L. Warren
Time:	9:30 a.m.
Place:	301
Date Action Filed:	Dec. 28, 2005
Trial Date:	None Scheduled
Attached Documents:	Exhibits A-E

I, Vince Chhabria, declare as follows:

I am employed as a Deputy City Attorney for the City and County of San Francisco. I submit this Declaration in Support of the City's Opposition to Petition for Writ of Mandate in the above-captioned matter.

1. Attached as Exhibit A is U.S. Census Data from 2000, downloaded from www.city-data.com on December 2, 2005. Exhibit 1 indicates that the neighborhoods of Bayview/Hunter's Point, the Mission District, Visitacion Valley, Ingleside, South of Market and Potrero Hill comprise only 35.5% of San Francisco's geographical area, and contain only 33.6% of San Francisco's population.

2. Attached as Exhibit B is U.S. Census Data from 2000, downloaded from www.city-data.com on December 2, 2005. Exhibit 2 indicates that the 247,289 residents of Marin County live in an area of 308.4 square miles, and the 12,853 residents of Mono County live in an area of 3,044.4 square miles.

3. Attached as Exhibit C are charts downloaded from the California Department of Health website at http://www.applications.dhs.ca.gov/epicdata/content/ST_firearm.htm on December 2, 2005. Exhibit 3 indicates that: (i) 1,844 San Francisco residents were hospitalized for non-fatal firearms injuries from 1991-2003; (ii) three residents of Mono County were hospitalized for non-fatal firearms injuries during the same period; and (iii) one resident of Alpine County was hospitalized for a non-fatal firearms injury during the same period.

4. Attached as Exhibit D is a true and correct copy of C. Loftin, et al., *Effects of Restrictive Licensing of Handguns on Homicide and Suicide in the District of Columbia,* 325 New England Journal of Medicine, 1615 (Dec. 5, 1991), downloaded from Westlaw on December 2, 2005.

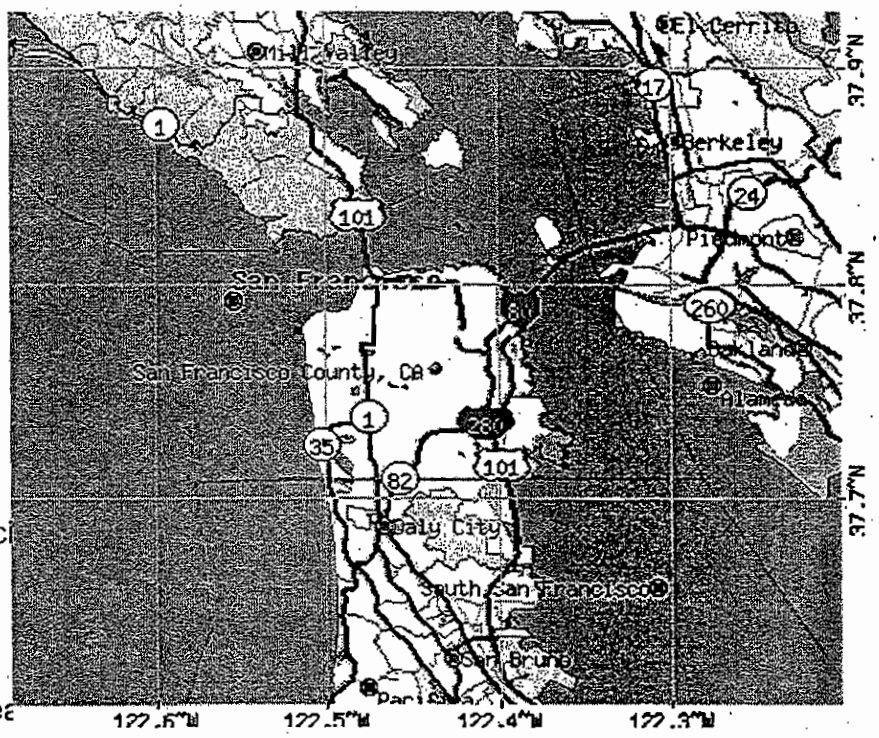
5. Attached as Exhibit E is a true and correct copy of A. Kellermann and D. Reay, *Protection or Peril? An analysis of Firearm-Related Deaths in the Home*, 314 New England Journal of Medicine 24, 1557 (June 1986).

Executed January 25, 2006, in San Francisco, California.

VINCE CHHABRIA

San Francisco County, CA

Back to: CA, All US cities.



County Population: 776,733
County Houses: 346,527
Land area: 46.7 sq. mi.
Water area: 185.2 sq. mi.

Industries providing employment: Professional,sci waste management services (19.3%), Educational,hea and social services (16.2%), Arts,entertainment,recreation,accommodation and food services (11.2%), Retail trade (10.3%), Finance,insurance,real estate,and rental and leasing (10.2%).

Type of workers:

- Private wage or salary: 79%
- Government: 12%
- Self-employed, not incorporated: 9%
- Unpaid family work: 0%

Races in San Francisco County:

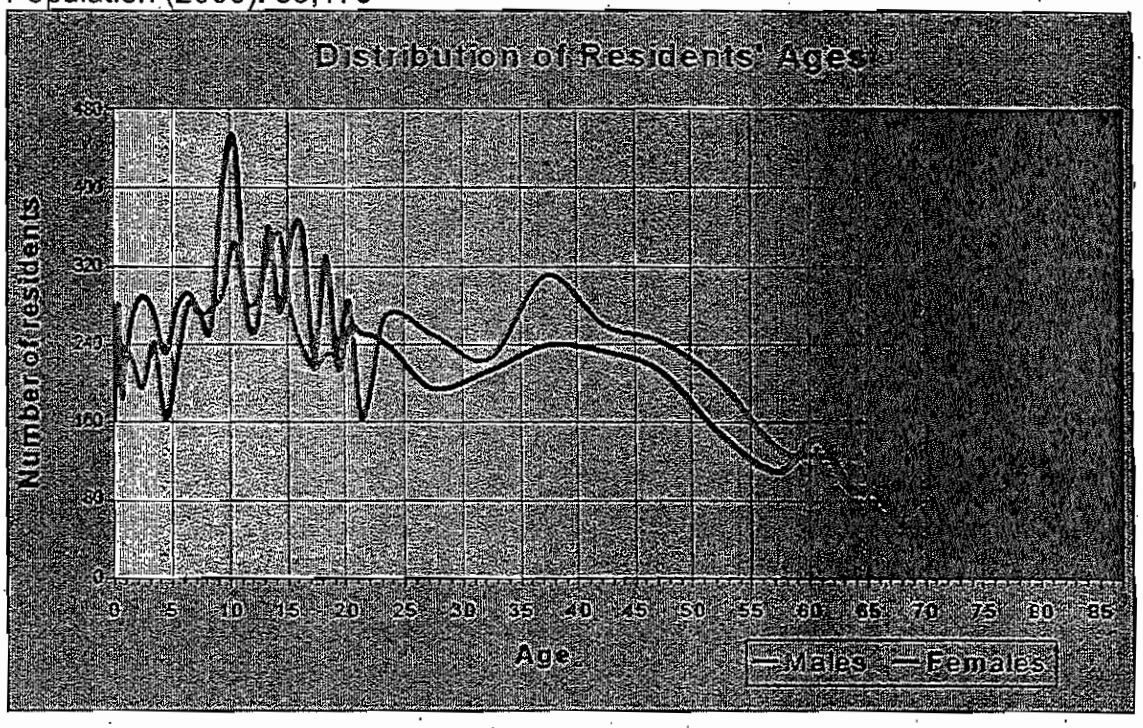
- White Non-Hispanic (43.6%)
- Chinese (19.6%)
- Hispanic (14.1%)
- Black (7.8%)
- Other race (6.5%)
- Filipino (5.2%)
- Two or more races (4.3%)
- Other Asian (1.5%)
- Japanese (1.5%)
- Vietnamese (1.4%)
- American Indian (1.2%)
- Korean (1.0%)
- Asian Indian (0.7%)

(Total can be greater than 100% because Hispanics could be counted in other races)

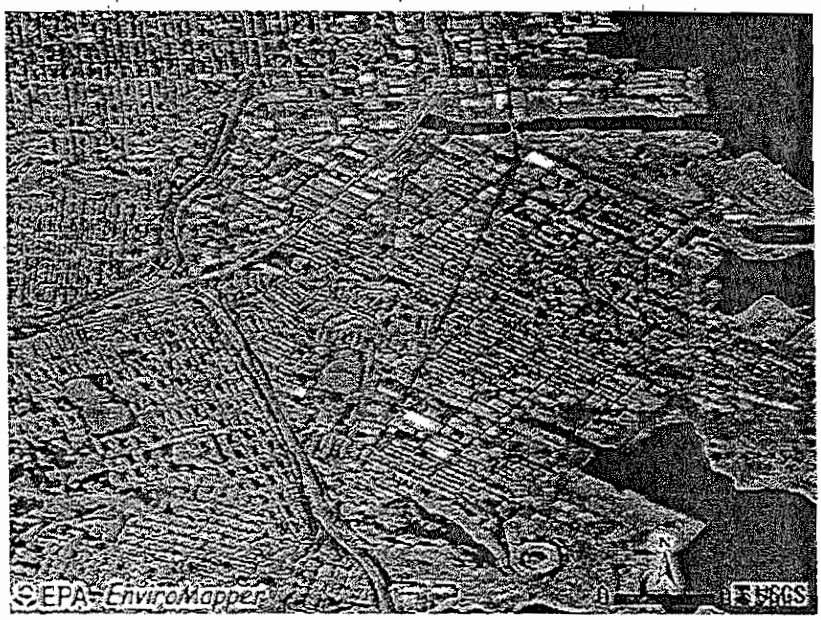
94124 Zip Code Detailed Profile

Back to All US cities.

City: San Francisco, CA
Population (2000): 33,170



Housing units: 9,583
Land area: 4.8 sq. mi.
Water area: 0.0 sq. mi.



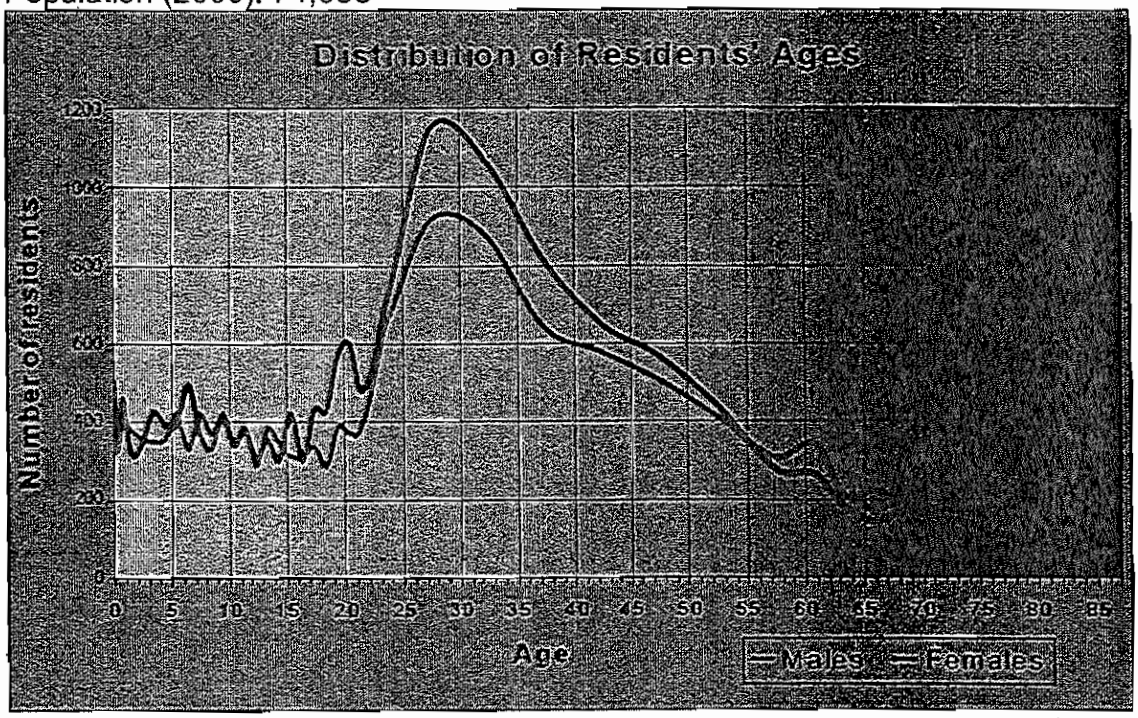
White population: 3,190
Black population: 15,922
American Indian population: 138
Asian population: 8,100
Native Hawaiian and Other Pacific Islander population: 1,168
Some other race population: 3,302
Two or more races population: 1,350

Urban population: 33,170
Rural population: 0

94110 Zip Code Detailed Profile

Back to All US cities.

City: San Francisco, CA
Population (2000): 74,633



Housing units: 26,918
Land area: 2.4 sq. mi.
Water area: 0.0 sq. mi.

White population: 39,110
Black population: 3,164
American Indian population: 754
Asian population: 9,189
Native Hawaiian and Other Pacific Islander population: 274
Some other race population: 17,397
Two or more races population: 4,745

Urban population: 74,633
Rural population: 0

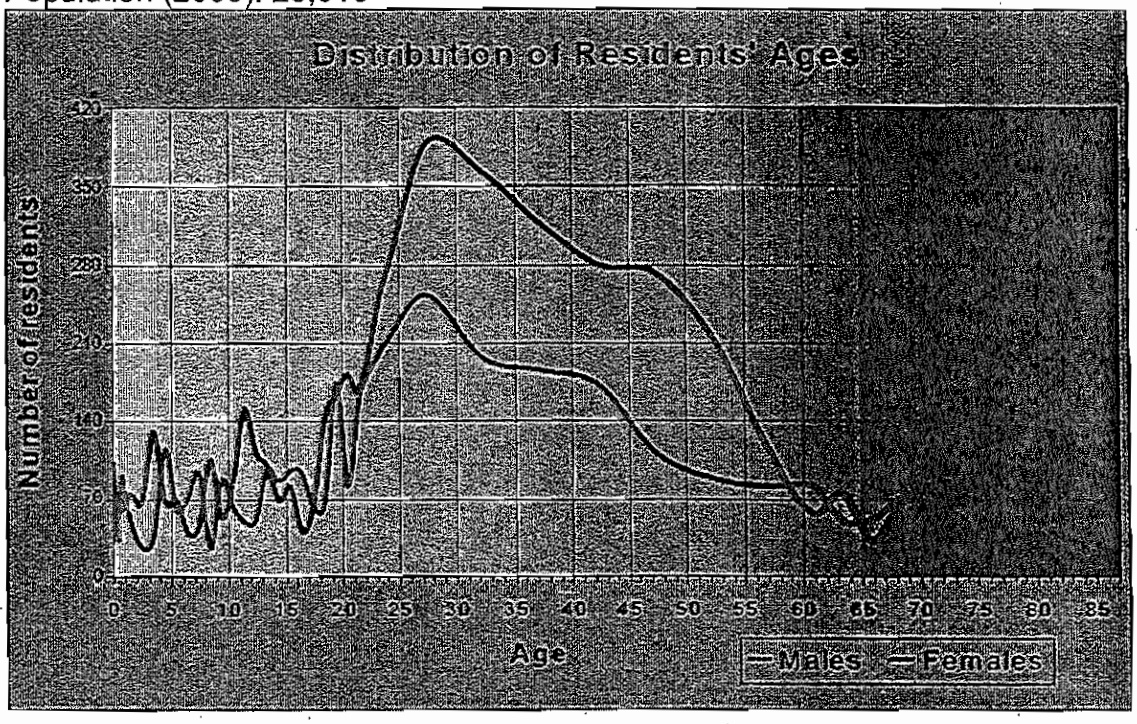
94103 Zip Code Detailed Profile

Find City

Profiles San Francisco, CA (94103) houses, apartments, residents, cars, jobs...

Back to All US cities.

City: San Francisco, CA
Population (2000): 23,016



Housing units: 10,093
Land area: 1.3 sq. mi.
Water area: 0.0 sq. mi.

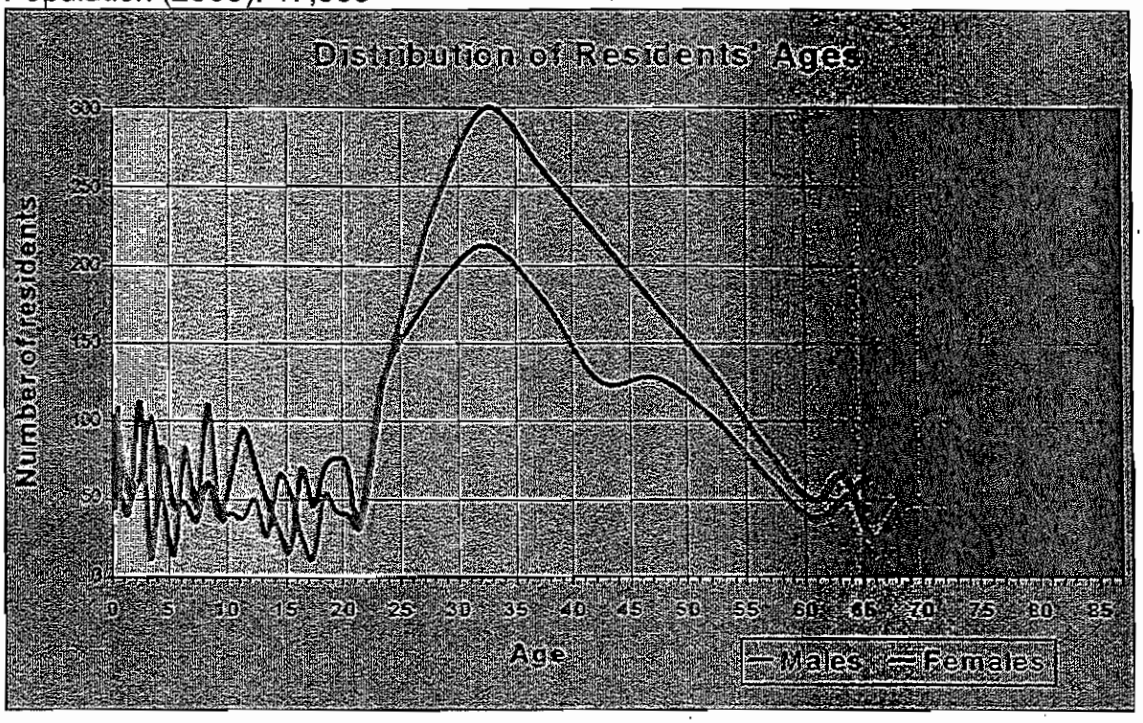
White population: 10,333
Black population: 2,705
American Indian population: 270
Asian population: 5,456
Native Hawaiian and Other Pacific Islander population: 107
Some other race population: 2,815
Two or more races population: 1,330

Urban population: 23,016
Rural population: 0

94107 Zip Code Detailed Profile

Back to All US cities.

City: San Francisco, CA
Population (2000): 17,368



Housing units: 9,816
Land area: 2.5 sq. mi.
Water area: 0.0 sq. mi.

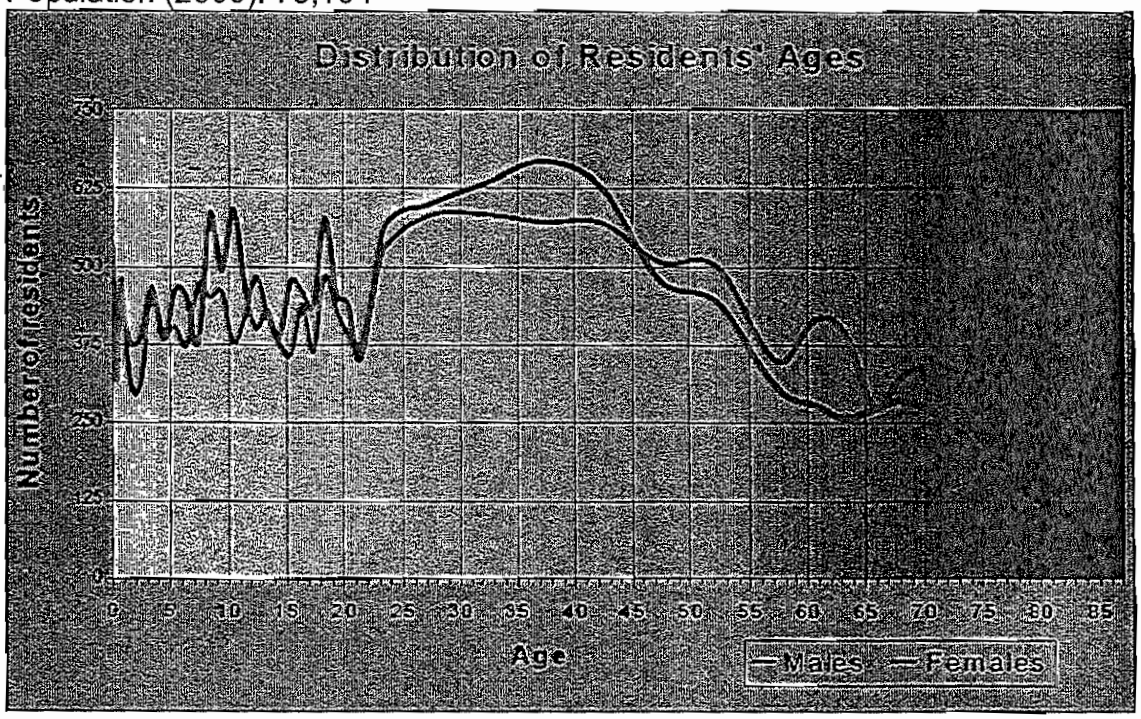
White population: 10,845
Black population: 2,266
American Indian population: 112
Asian population: 2,610
Native Hawaiian and Other Pacific Islander population: 161
Some other race population: 632
Two or more races population: 742

Urban population: 17,368
Rural population: 0

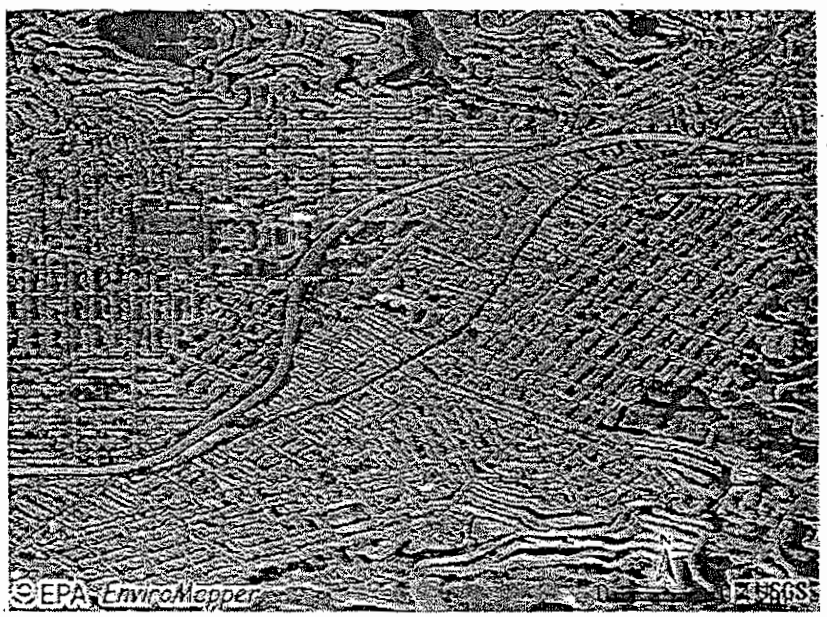
94112 Zip Code Detailed Profile

Back to All US cities.

City: San Francisco, CA
Population (2000): 73,104



Housing units: 20,652
Land area: 3.3 sq. mi.
Water area: 0.0 sq. mi.

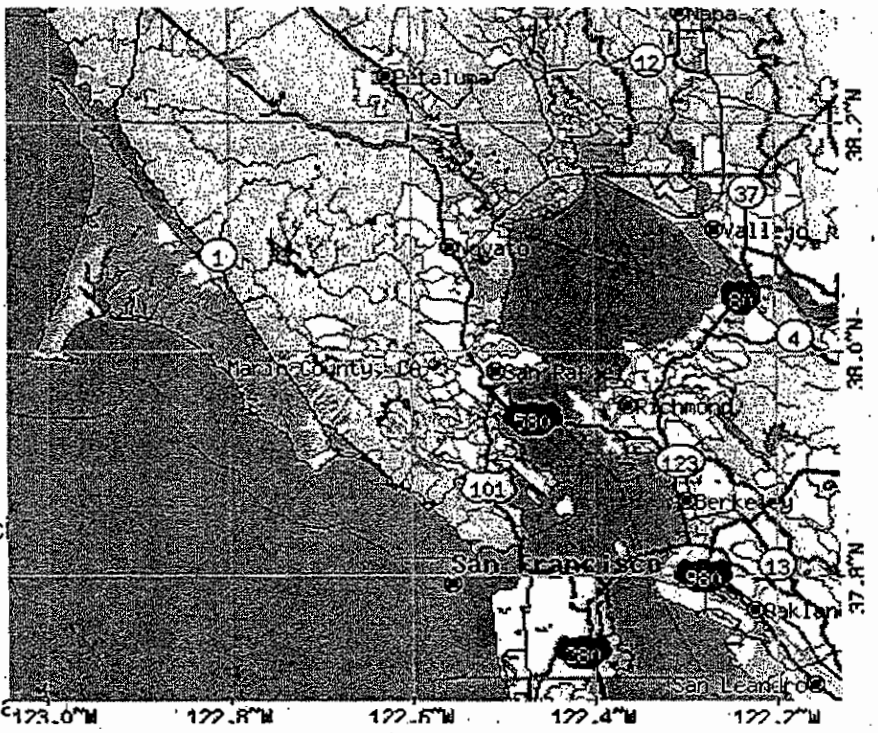


White population: 21,138
Black population: 4,640
American Indian population: 271
Asian population: 32,842
Native Hawaiian and Other Pacific Islander population: 355
Some other race population: 10,146
Two or more races population: 3,712

Urban population: 73,104
Rural population: 0

Marin County, CA

Back to: CA, All US cities.



County Population: 247,289
County Houses: 104,990
Land area: 519.8 sq. mi.
Water area: 308.4 sq. mi.

Industries providing employment: Professional,sc waste management services (20.1%), Educational,hea and social services (18.5%), Finance,insurance,real estate,and rental and leasing (11.5%), Retail trade (10.7%).

Type of workers:

- Private wage or salary: 72%
- Government: 10%
- Self-employed, not incorporated: 17%
- Unpaid family work: 0%

Races in Marin County:

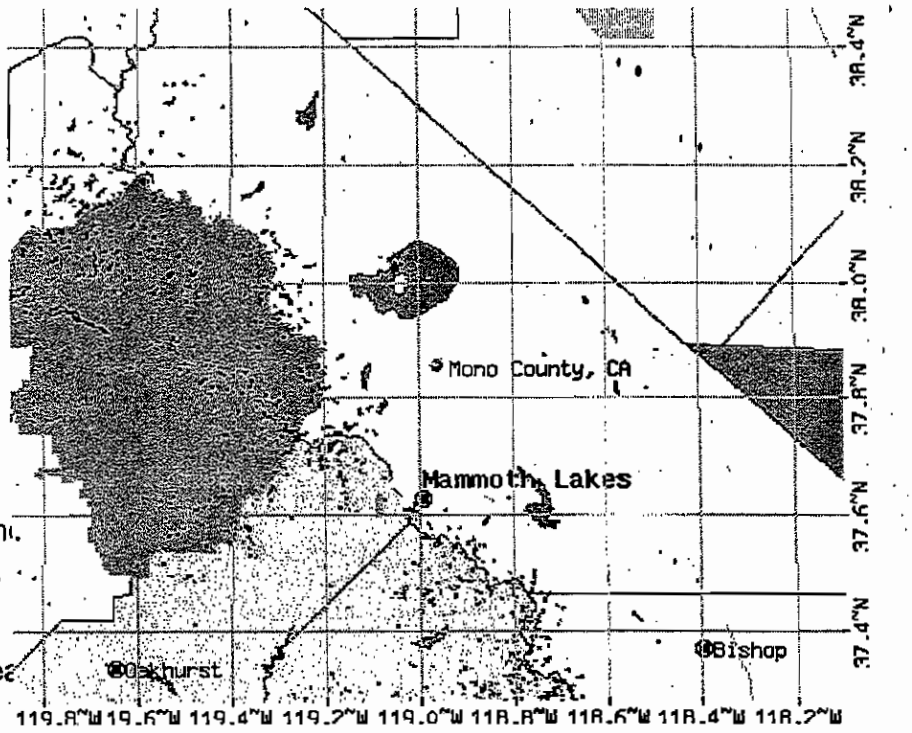
- White Non-Hispanic (78.6%)
- Hispanic (11.1%)
- Other race (4.5%)
- Two or more races (3.5%)
- Black (2.9%)
- Chinese (1.4%)
- American Indian (1.1%)
- Japanese (0.7%)
- Filipino (0.6%)
- Asian Indian (0.5%)
- Vietnamese (0.5%)

(Total can be greater than 100% because Hispanics could be counted in other races)

Median age: 41.3 years
Males: 49.6%, Females: 50.4%
Average household size in Marin County: 2.34

Mono County, CA

Back to: CA, All US cities.



County Population: 12,853
County Houses: 11,757
Land area: 3044.4 sq. mi.
Water area: 87.4 sq. mi.

Industries providing employment: Arts,entertainm. and food services (30.0%), Educational,hea and social services (14.4%), Construction (11.2%), Retail trade (10.1%).

Type of workers:
- Private wage or salary: 67%
- Government: 19%
- Self-employed, not incorporated: 13%
- Unpaid family work: 1%

Races in Mono County:
- White Non-Hispanic (76.5%)
- Hispanic (17.7%)
- Other race (9.5%)
- American Indian (3.2%)
- Two or more races (2.2%)

(Total can be greater than 100% because Hispanics could be counted in other races)

Median age: 36.0 years
Males: 54.9%, Females: 45.1%
Average household size in Mono County: 2.43
Median household income: $44,992 (year 2000)
Median house value: $236,300 (year 2000)
Median montly rent in 2000: $682
Institutionalized population: 36
Median monthly costs for houses with a mortgage in Mono County in 2000: $1462

Firearm Injuries, 1991 to 2003
Nonfatal Hospitalized Injuries
San Francisco County Residents

	<1	1-4	5-12	13-15	16-20	21-44	45-64	65+	Total
1991	0	0	4	11	79	172	4	4	274
1992	0	0	1	17	57	164	15	2	256
1993	0	1	0	19	72	142	21	3	258
1994	0	1	2	6	48	125	15	0	197
1995	0	0	1	8	48	101	13	1	172
1996	0	0	4	6	43	70	6	1	130
1997	0	0	0	4	31	58	5	2	100
1998	0	0	0	5	27	34	5	1	72
1999	0	1	1	4	24	48	7	0	85
2000	0	0	2	4	22	46	3	1	78
2001	0	0	0	3	20	44	3	0	70
2002	0	0	0	2	20	50	4	0	76
2003	0	0	1	1	16	52	6	0	76
Total	0	3	16	90	507	1,106	107	15	1,844

Prepared by California Department of Health Services, EPIC Branch
Source: California Office of Statewide Health Planning and Development, Patient Discharge Data
December 2, 2005

Firearm Injuries, 1991 to 2003
Nonfatal Hospitalized Injuries
Alpine County Residents

	<1	1-4	5-12	13-15	16-20	21-44	45-64	65+	Total
1991	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0
1996	0	0	1	0	0	0	0	0	1
1997	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	0	1

Prepared by California Department of Health Services, EPIC Branch
Source: California Office of Statewide Health Planning and Development, Patient Discharge Data
December 2, 2005

Firearm Injuries, 1991 to 2003
Nonfatal Hospitalized Injuries
Mono County Residents

	<1	1-4	5-12	13-15	16-20	21-44	45-64	65+	Total
1991	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	1	0	0	1
1995	0	0	0	0	0	2	0	0	2
1996	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	3	0	0	3

Prepared by California Department of Health Services, EPIC Branch
Source: California Office of Statewide Health Planning and Development, Patient Discharge Data
December 2, 2005

Effects Of Restrictive Licensing Of Handguns On Homicide And Suicide In The District Of Columbia (Special Article)

Loftin, Colin; McDowall, David; Wiersema, Brian; Cottey, Talbert J.

The New England Journal of Medicine
Dec 5,
1991;
325 (23),pp 1615-1620
LINE COUNT: 00391
WORD COUNT: 05396
ISSN: 0028-4793

CORPORATE SOURCE: From the Violence Research Group, Institute of Criminal Justice and Criminology, University of Maryland at College Park, 2220 Lefrak Hall, College Park, MD 20742-8235, where reprint requests should be addressed to Dr. Loftin.

Abstract

Background. Whether restricting access to handguns will reduce firearm-related homicides and suicides is currently a matter of intense debate. In 1976 the District of Columbia adopted a law that banned the purchase, sale, transfer, or possession of handguns by civilians. We evaluated the effect of implementing this law on the frequency of homicides and suicides.

Methods. Homicides and suicides committed from 1968 through 1987 were classified according to place of occurrence (within the District of Columbia or in adjacent metropolitan areas where the law did not apply), cause (homicide or suicide), mechanism of death (firearms or other means), and time of occurrence (before or after the implementation of the law). The number of suicides and homicides was calculated for each month during the study period, and differences between the mean monthly totals before and after the law went into effect were estimated.

Results. In Washington, D.C., the adoption of the gun-licensing law coincided with an abrupt decline in homicides by firearms (a reduction of 3.3 per month, or 25 percent) and suicides by firearms (reduction, 0.6 per month, or 23 percent). No similar reductions were observed in the number of homicides or suicides committed by other means, nor were there similar reductions in the adjacent metropolitan areas in Maryland and Virginia. There were also no increases in homicides or suicides by other methods, as would be expected if equally lethal means were substituted for handguns.

Conclusions. Restrictive licensing of handguns was associated with a prompt decline in homicides and suicides by firearms in the District of Columbia. No such decline was observed for homicides or suicides in which guns were not used, and no decline was seen in adjacent metropolitan areas

where restrictive licensing did not apply. Our data suggest that restrictions on access to guns in the District of Columbia prevented an average of 47 deaths each year after the law was implemented. (N Engl J Med 1991;325:1615-20.)

TEXT

By any measure, firearms -- especially handguns -- are a leading instrument of violent injury. In 1987, firearms accounted for 32,919 fatalities in the United States: 18,144 suicides, 12,665 homicides, and 2110 unintentional fatalities, legal interventions (killings by law-enforcement officials), or deaths of undetermined type (Ref. 1). Sixty percent of all homicides and suicides during this year were committed with guns, (Ref. 1) and handguns accounted for three fourths of the homicides by firearms (Ref. 2).

A central question in research on the prevention of gun-related mortality is whether restricting access to handguns would reduce deaths by firearms (Ref. 3). One approach to the issue is to examine patterns of mortality associated with changes in local, state, or national regulations. In 1976 the District of Columbia adopted one of the most restrictive handgun policies in the nation. The law prohibited the purchase, sale, transfer, and possession of handguns by civilians in Washington, D.C., unless a citizen already owned the handgun and had registered it under an existing system (Ref. 4). We conducted an interrupted time-series study to determine whether the implementation of the law reduced gun-related homicides and suicides.

Methods

The Law

The District of Columbia's Firearms Control Regulations Act was signed by the mayor on July 23, 1976, and went into effect on September 24, 1976. A restraining order issued on December 9, 1976, interrupted its enforcement for 49 days, but the Appeals Court of the District of Columbia reinstated the law, and its provisions became fully effective again on February 21, 1977 (Ref. 5).

The law restricts the possession of firearms to persons who hold registration certificates. Persons who owned firearms at the time the law was implemented and who had registered them under the provisions of the 1968 code were given 60 days to reregister them. After the initial reregistration period, handguns became unregisterable'' and therefore illegal. Newly acquired rifles and shotguns can be registered if they are obtained in person from a licensed dealer in the district and if the owner meets specified requirements relating to age, criminal record, physical fitness, and knowledge of firearms laws and safe use. Finally, the law requires that registrants keep firearms unloaded and disassembled or locked up except while they are being used for lawful recreational purposes or

when they are kept at a place of business. The penalty originally specified for violation of the law was 10 days in jail and a $300 fine. It was increased to one year in jail and a $1,000 fine in March 1981.

Study Design

We undertook a longitudinal study, comparing the mean monthly numbers of gun-related homicides and suicides in the District of Columbia before the law was implemented with the numbers after its implementation. Comparisons with other areas and other types of deaths were used to determine whether the observed differences were specific to the District of Columbia. For comparison we used suicides and homicides committed in the district without firearms, homicides and suicides committed with firearms in adjacent metropolitan areas in Maryland and Virginia, and homicides and suicides committed without firearms in the adjacent metropolitan areas.

Definition and Classification of Cases

Monthly totals of homicides and suicides in the District of Columbia and suburban Maryland and Virginia during the period 1968 through 1987 (the last year for which data were available) were obtained from tapes produced by the National Center for Health Statistics (NCHS) (Ref. 1). The cases were classified according to place of occurrence (within the District of Columbia or in an adjacent metropolitan area), cause of death (homicide or suicide), mode of death (firearms or other means), and month of occurrence. The adjacent metropolitan areas were the parts of the Washington, D.C.-Maryland-Virginia Standard Metropolitan Statistical Area (SMSA) as constituted in 1967, (Ref. 6) exclusive of the District of Columbia. Specifically, this area included the cities of Alexandria, Fairfax, and Falls Church, Virginia; Arlington, Fairfax, Loudoun, and Prince William counties in Virginia; and Montgomery and Prince George's counties in Maryland.

The cause and mechanism of death in each case were classified according to the codes in the International Classification of Diseases, 8th Revision (ICD-8) and International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) (Ref. 7,8). Four groups were defined: homicide by firearms (codes E965 in ICD-8 and E965.0 through E965.4 in ICD-9-CM); homicide by other means (E960 through E964 and E966 through E969 in ICD-8, and E960 through E964 and E965.5 through E969 in ICD-9-CM); suicide by firearms (E955 in ICD-8 and E955.0 through E955.4 in ICD-9-CM); and suicide by other means (E950 through E954 and E956 through E959 in ICD-8, and E950 through E954 and E955.5 through E959 in ICD-9-CM). Unintentional deaths (E922) and deaths caused by firearms in which the intent was unknown (E980 through E989) were excluded because the monthly frequencies were too low for meaningful analysis. A further refinement that would have classified deaths as caused by specific types of firearms, such as handguns, was not possible because the ICD-8 codes did not distinguish handguns from other firearms. In all, eight separate 240-month time series

(105 months before the implementation of the law and 135 months thereafter) were analyzed. The first month after the law went into effect was October 1976.

As a check against possible effects of changes in the population, we conducted a similar analysis using annual mortality rates. For the District of Columbia, which is treated as a state for reporting purposes, annual population estimates from 1968 through 1987 for five age groups (<5, 5 through 19, 20 through 44, 45 through 64, and greater/= 65 years) were taken from NCHS vital-statistics records (Ref. 9). For the adjacent metropolitan areas, population estimates according to age were not available, but total population estimates for 1968 through 1987 were obtained from the Census Bureau's Current Population Reports (the values for 1969, 1978, and 1979 were interpolated, because county-level estimates were not generated by the Census Bureau for those years) (Ref. 10,11). For the District of Columbia, age-standardized rates were calculated by the direct method, with the population of the district enumerated in the 1970 census as the standard (Ref. 12). Crude rates were calculated for the surrounding metropolitan areas. The first year after the law was implemented that is included in the annual analysis is 1977.

Statistical Analysis

Statistical inferences were based on two approaches. First, the observations were assumed to be independently sampled from the populations in the District of Columbia before and after the implementation of the law. According to this model, the difference between the mean monthly rates of fatalities is an estimate of the magnitude of the intervention (i.e., the effect of the law), and the statistical significance of the differences can be assessed with the usual t-test (Ref. 13). Second, because observations in a time series are often not independent (that is, they are serially correlated), we also applied Box and Tiao's methods (Ref. 14) for intervention analysis. Box-Tiao methods are based on the autoregressive, integrated, moving-average time-series models proposed by Box and Jenkins (Ref. 15). Following a strategy recommended by Box and Jenkins, we used the data to identify and estimate appropriate models for within-series correlation. Components representing the effect of the intervention (the law) were then added. For each series, we considered models in which change was abrupt and permanent, gradual and permanent, or abrupt and temporary (Ref. 16). All these analyses were conducted with use of algorithms in the SCA Statistical System software (Ref. 17).

For the analysis of the data on monthly frequency, serial correlation was minimal; therefore, the simple t-test statistics are presented. For some of the annual mortality rates, there was evidence of a relatively strong serial correlation among the observations. For these series, statistical inferences are based on the more complex Box-Tiao models. Details about the Box-Tiao estimates are available elsewhere.* All P values

are two-tailed. ----------

*: See NAPS document no. 04909 for four pages of supplementary material. Order from NAPS c/o Microfiche Publications, P.O. Box 3513, Grand Central Station, New York, NY 10163-3513. Remit in advance (in U.S. funds only) $7.75 for photocopies or $5 for microfiche. Outside the U.S. and Canada add postage of $4.50 ($1.75 for microfiche postage). There is a $15 invoicing charge on all orders filled before payment.

Results

In the District of Columbia, the mean frequency of both suicides and homicides by firearms declined by about one quarter in the period after the law went into effect (Table 1). Gun-related homicides, with a mean of 13.0 per month before the law was implemented, declined to a mean of 9.7 per month thereafter (Fig. 1). Similarly, suicides in which guns were used declined from a mean of 2.6 per month to 2.0 per month (Fig. 2). When we used both a sampling model that assumed independent observations (Table 1) and one that assumed serial dependence of observations,* these differences between the means before and after the law went into effect were statistically significant ($P<0.001$ for homicides and $P = .0.005$ for suicides). Accordingly, the data are consistent with a model in which there was a decrease in the number of deaths by firearms after the law was implemented. *Table 1. Mean Numbers of Homicides and Suicides per Month, According to Jurisdiction and Method, before and after the Implementation of the District of Columbia Law *. **TABLE OMITTED** *Figure 1.-Number of Homicides by Firearms per Month in Washington, D.C. The horizontal lines show the means before and after the implementation of the gun-licensing law, indicated by the vertical line *. **FIGURE OMITTED** *Figure 2.-Number of Suicides by Firearms per Month in Washington, D.C. The horizontal lines show the means before and after the implementation of the gun-licensing law, indicated by the vertical line *. **FIGURE OMITTED**

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In contrast, none of the comparison time series showed declines of similar magnitude during the same period. Non-gun-related homicides (Fig. 3) and non-gun-related suicides (Fig. 4) in the District of Columbia declined only slightly (by 0.3 per month, or 4 percent, for homicides, and by 0.4 per month, or 9 percent, for suicides). Neither of these differences was statistically significant. *Figure 3.-Number of Homicides by Means Other than Firearms per Month in Washington, D.C. The horizontal lines show the means before and after the implementation of the gun-licensing law,

indicated by the vertical line *. **FIGURE OMITTED** *Figure 4.-Number of Suicides by Means Other than Firearms per Month in Washington, D.C. The horizontal lines show the means before and after the implementation of the gun-licensing law, indicated by the vertical line *. **FIGURE OMITTED**

The adjacent areas in Maryland and Virginia, which were not subject to the change in gun regulations, did not have declines in gun-related homicides and suicides similar to those observed in the District of Columbia. The mean for gun-related homicides in these adjacent areas after the District of Columbia law was implemented was lower by 0.4 homicide per month (a decline of 7 percent), but the rate of suicides in which guns were used was higher by 1.1 per month (an increase of 12 percent). Neither difference represents a statistically significant decline.

The series of cases in Maryland and Virginia provide additional evidence that the decline in fatalities was specific to suicides and in the District of Columbia. Homicides committed with other weapons in Maryland and Virginia increased by 23 percent, or 0.7 homicide per month, whereas the frequency of suicides by other methods changed very little: there was a decrease of 0.2 suicide per month, or 2 percent.

The analysis of annual mortality rates gave results similar in general pattern to those of the analysis of the monthly data. The Box-Tiao estimates are available elsewhere.* In the District of Columbia the rates of both homicides and suicides by firearms declined in the period after the law went into effect ($P<0.001$ and $P = 0.085$, respectively); at the same time, the rate of homicides committed by other means increased ($P = 0.082$) and that of suicides by other means did not change ($P = 0.653$). In the surrounding metropolitan area there were no significant changes in the annual mortality rates.

In summary, there was an abrupt decline in both suicides and homicides by firearms that coincided with the implementation of the restrictive licensing law. The reductions were specific to fatalities involving guns in the District of Columbia. No similar reduction was observed in homicides or suicides committed without guns, nor were there reductions in the adjacent areas of Maryland and Virginia, where the provisions of the law were not in effect.

Discussion

The strongest argument for attributing the reductions in homicides and suicides by firearms in the District of Columbia to the restrictive licensing law is the relative implausibility of alternative explanations. Earlier studies of the District of Columbia law, which were published a few years after the law was implemented, (Ref. 18,19) were limited by a paucity of data and by the investigators' failure to compare deaths by firearms and deaths by other means. These studies demonstrated declines in violent crime but

did not successfully show that the declines were limited to the District of Columbia or to violence involving guns. Accordingly, critics noted that the declines were probably due to confounding demographic trends or to unrelated criminal-justice policies (Ref. 20,21).

In the light of our study, alternative explanations appear implausible. The pattern of change in mortality rates that would be predicted from the effects of the gun law is specific and is unlikely to be simulated by coincidental changes in demographic, economic, cultural, or social factors. For example, economic factors might alter the homicide rate or the suicide rate, but it is unlikely that they would affect only deaths involving guns and that the changes would be limited to the District of Columbia. Similarly, improvements in the medical treatment of gunshot wounds since the Vietnam War or marked changes in the activities of the drug underworld might have reduced gun-related fatalities, but the expected pattern of changes would not be those that we observed. Improved medical treatment would be available in both the city and the suburbs, and changes in the drug underworld would not influence both homicides and suicides. Furthermore, the analysis of mortality rates indicates that the declines in homicides and suicides by firearms were not due to changes in characteristics of the resident population. The population estimates are, of course, subject to error, and complex changes in high-risk groups are also possible. Nevertheless, the population at risk was the same for both gun-related and non-gun-related mortality. Therefore, the differences between the rate of mortality by firearms and that of mortality due to other causes cannot be attributed to a failure to study the appropriate population.

The best explanation for the District of Columbia data is the weapon-choice theory developed by Zimring, (Ref. 22) Cook, (Ref. 23) and others (Ref. 24,25). According to this view, assaults, whether against others or self-directed, vary with respect to intent to kill. Some are characterized by a sustained, single-minded determination, whereas in others the intention is more episodic and ambivalently motivated. If the resolve is weak or short-lived, the relative frequency with which a particular type of weapon is used will be influenced by its availability (Ref. 23). The key element in the theory is that firearms are more likely to cause death than are other weapons that are likely to be substituted. It follows that even if there is no change in the number of assaults or suicide attempts, a reduction in the availability of guns will result in a reduction in the number of deaths. The theory recognizes that people with more deadly intent may tend to select guns rather than other means, but it assumes that the association is less than perfect. Some people select guns because they are determined to kill, but others do so only because a gun is readily available.

The observations in the District of Columbia fit the predictions of

the Zimring-Cook theory well. Especially interesting is the fact that in the District of Columbia there were no compensating increases in homicides or suicides by methods other than guns, as has been suggested in other studies (Ref. 26,27). The effects of the law were apparently truly preventive, in the sense that there was an overall reduction in the number of deaths. There may have been an increase in nonlethal injuries from weapons other than guns, but surveillance data on nonfatal injuries are not available.

The most surprising feature of the District of Columbia experience is the magnitude and suddenness of the effect. Observers expected the gun-licensing law to have limited or gradual effects because it grandfathered'' previously registered handguns and did not directly remove existing guns from their owners. In addition, observers argued that social conditions, including high levels of criminal violence and fear of victimization, were not affected and that there would thus continue to be a high level of demand for illegal guns that could easily be supplied from neighboring jurisdictions (Ref. 23,28). In spite of these limitations, the law reduced gun-related suicides and homicides substantially and abruptly. Because people voluntarily disposed of guns or altered their patterns of storage and use, or because it was more difficult to obtain a new gun, the District of Columbia had about 47 fewer gun deaths each year after the restrictive licensing law was implemented.

The facts that the frequency of gun-related homicides remained high in the District of Columbia after the gun law went into effect and that there have been dramatic increases in homicides very recently are not incompatible with the argument that the restrictive licensing law had a preventive effect on homicides. The number of homicides is determined by many factors other than legal restrictions on access to guns. Since the economic and social conditions in the district are similar to those associated with high rates of homicide in other cities, it is not surprising that the frequency of homicide remained high in the District of Columbia or that in the district, as in many other cities in the late 1980s, there were dramatic increases in homicides attributable to the spread of crack'' cocaine (Ref. 23,29,30). It is reasonable to assume that the restrictions on access to guns in the district continued to exert a preventive effect even as homicide rates were driven up by conflict over drugs and other factors.

The data from the District of Columbia provide strong evidence that restrictive licensing of handguns reduced gun-related homicides and suicides, but they have limited usefulness in generalizing to other jurisdictions or to other policies designed to limit access to handguns. Comparative studies of other gun-licensing laws would provide information on which to base wider generalizations and increase our understanding of the factors that influence the preventive effect of licensing laws.

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PROTECTION OR PERIL?

An Analysis of Firearm-Related Deaths in the Home

ARTHUR L. KELLERMANN, M.D., M.P.H., AND DONALD T. REAY, M.D.

Abstract To study the epidemiology of deaths involving firearms kept in the home, we reviewed all the gunshot deaths that occurred in King County, Washington (population 1,270,000), from 1978 through 1983. The medical examiner's case files were supplemented by police records or interviews with investigating officers or both, to obtain specific information about the circumstances, the scene of the incident, the type of firearm involved, and the relationship of the suspect to the victim. A total of 743 firearm-related deaths occurred during this six-year period, 398 of which (54 percent) occurred in the residence where the firearm was kept. Only 2 of these 398 deaths (0.5 percent) involved an intruder shot during attempted entry. Seven persons (1.8 percent) were killed in self-defense. For every case of self-protection homicide involving a firearm kept in the home, there were 1.3 accidental deaths, 4.6 criminal homicides, and 37 suicides involving firearms. Handguns were used in 70.5 percent of these deaths.

The advisability of keeping firearms in the home for protection must be questioned. (N Engl J Med 1986; 314: 1557-60.)

THERE are approximately 120 million guns in private hands in the United States.[1,2] About half of all the homes in America contain one or more firearms.[1-8] Although most persons who own guns keep them primarily for hunting or sport, three quarters of gun owners keep them at least partly for protection.[1-4] One fifth of gun owners identify "self-defense at home" as their most important reason for having a gun.[5]

Keeping firearms in the home carries associated risks.[1,9] These include injury or death from unintentional gunshot wounds, homicide during domestic quarrels, and the ready availability of an immediate, highly lethal means of suicide. To understand better the epidemiology of firearm-related deaths in the home, we studied all the gunshot deaths that occurred in King County, Washington, between 1978 and 1983. We were especially interested in characterizing the gunshot deaths that occurred in the residence where the firearm involved was kept.

Methods

King County, Washington (1980 census population 1,270,000), contains the cities of Seattle (population 494,000) and Bellevue (population 74,000), as well as a number of smaller communities.[10]

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Dr. Kellermann was a Fellow in the University of Washington Robert Wood Johnson Clinical Scholars Program at the time this research was conducted. The views expressed are those of the authors and do not necessarily reflect those of the Robert Wood Johnson Foundation.

The county population is predominantly urban (92 percent) and white (88.4 percent), with smaller black (4.4 percent) and Asian (4.3 percent) minorities. All violent deaths in King County are investigated by the office of the medical examiner.

We systematically reviewed the medical examiner's case files to identify every firearm-related death that occurred in the county between January 1, 1978, and December 31, 1983. In addition to general demographic information, we obtained specific data regarding the manner of death, the scene of the incident, the circumstances, the relationship of the suspect to the victim, the type of firearm involved, and the blood alcohol level of the victim at the time of autopsy. When records were incomplete, corroborating information was obtained from police case files and direct interviews with the original investigating officers.

Gunshot deaths involving the intentional shooting of one person by another were considered homicides. Self-protection homicides were considered "justifiable" if they involved the killing of a felon during the commission of a crime; they were considered "self-defense" if that was the determination of the investigating police department and the King County prosecutor's office.[11] All homicides resulting in criminal charges and all unsolved homicides were considered criminal homicides.

The circumstances of all homicides were also noted. Homicides committed in association with another felony (e.g., robbery) were identified as "felony homicides." Homicides committed during an argument or fight were considered "altercation homicides." Those committed in the absence of either set of circumstances were termed "primary homicides."

Deaths from self-inflicted gunshot wounds were considered suicides if they were officially certified as such by one of us (D.T.R.), who is the medical examiner. Unintentional self-inflicted gunshot wounds were classified as accidental. Although the medical examiner's office considers deaths involving the unintentional shooting of one person by another as homicide, we classified these deaths as accidental for our analysis. Deaths in which there was uncertainty about the circumstances or motive were identified as "undetermined."

Results

Over the six-year interval, the medical examiner's office investigated 743 deaths from firearms (9.75 deaths per 100,000 person-years). This total represented 22.7 percent of all violent deaths occurring in King County during this period, excluding traffic deaths. Firearms were involved in 45 percent of all homicides and 49 percent of all suicides in King County — proportions lower than the national averages of 61 and 57 percent, respectively.[12,13] Guns accounted for less than 1 percent of accidental deaths and 5.7 percent of deaths in which the circumstances were undetermined (Table 1).

Of the 743 deaths from firearms noted during this six-year period, 473 (63.7 percent) occurred inside a house or dwelling, and 398 (53.6 percent) occurred in the home where the firearm involved was kept. Of these 398 firearm deaths, 333 (83.7 percent) were suicides, 50 (12.6 percent) were homicides, and 12 (3 percent) were accidental gunshot deaths. The precise manner of death was undetermined in three additional cases involving self-inflicted gunshot wounds.

In 265 of the 333 cases of suicide (80 percent), the victim was male. A blood ethanol test was positive in 86 of 245 suicide victims tested (35 percent) and showed a blood ethanol level of 100 mg per deciliter or more in 60 of the 245 (24.5 percent). Sixty-eight percent of the suicides involved handguns. In eight cases, the medical examiner's case files specifically noted that the victim had acquired the firearm within two days of committing suicide.

The victim was male in 30 of the 50 homicide deaths (60 percent). A blood ethanol test was positive in 27 of 47 homicide victims tested (57 percent) and showed a blood ethanol level of 100 mg per deciliter or more in 10 of the victims (21 percent). Handguns were involved in 34 of these deaths (68 percent).

Forty-two homicides (84 percent) occurred during altercations in the home, including seven that were later determined to have been committed in self-defense. Two additional homicides involving the shooting of burglars by residents were considered legally "justifiable."[11] Forty-one homicides (82 percent) resulted in criminal charges against a resident of the house or apartment in which the shooting occurred.

Four of the 12 accidental deaths involved self-inflicted gunshot wounds. All 12 victims were male. A blood ethanol test in the victims was positive in only two cases. Eleven of these accidental deaths involved handguns.

Excluding firearm-related suicides, 65 deaths occurred in the house where the firearm involved was kept (Table 2). In two of these cases, the victim was a stranger to the persons living in the house, whereas in 24 cases (37 percent), the victim was an acquaintance or friend. Thirty-six gunshot victims (55 percent) were residents of the house in which the shooting occurred, including 29 who were victims of homicide. Residents were most often shot by a relative or family member (11 cases), their spouse (9 cases), a roommate (6 cases), or themselves (7 cases) (Table 2).

Table 1. Violent Deaths in King County, Washington, 1978–1983.*

Manner of Death	Total Deaths	Firearm Deaths	
		Number	% of Total
Suicide	1,049	469	45.0
Homicide†	521	256	49.0
Accidental	1,581	11	0.7
Undetermined	122	7	5.7
Total	3,273	743	22.7

*Data on traffic deaths are not included.
†Category includes unintentional homicides.

Table 2. Relationship of Victim to Resident in Nonsuicidal Deaths Involving a Firearm Kept in the Home.

Relationship	No.	%	Relative Risk*
Stranger	2	3	1.0
Friend or acquaintance	24	37	12.0
Nonresident relative	3	5	1.5
Resident	36	55	18.0
Relative	11	17	
Spouse	9	14	
Roommate	6	9	
Self	7	11	
Other	3	4	

*Based on the number of homicides involving strangers.

Guns kept in King County homes were involved in the deaths of friends or acquaintances 12 times as often as in those of strangers. Even after the exclusion of firearm-related suicides, guns kept at home were involved in the death of a member of the household 18 times more often than in the death of a stranger (Table 3). For every time a gun in the home was involved in a "self-protection" homicide, we noted 1.3 accidental gunshot deaths, 4.6 criminal homicides, and 37 firearm-related suicides (Table 3).

Discussion

We found the home to be a common location for deaths related to firearms. During our study period, almost two thirds of the gunshot deaths in King County occurred inside a house or other dwelling. Over half these incidents occurred in the residence in which the firearm involved was kept. Few involved acts of self-protection.

Less than 2 percent of homicides nationally are considered legally justifiable.[11,13] Although justifiable homicides do not include homicides committed in self-defense, the combined total of both in our study was still less than one fourth the number of criminal homicides involving a gun kept in the home. A majority of these homicide victims were residents of the house or apartment in which the shooting occurred.

Over 80 percent of the homicides noted during our study occurred during arguments or altercations. Baker has observed that in cases of assault, people tend to reach for the most lethal weapon readily available.[14] Easy access to firearms may therefore be particularly dangerous in households prone to domestic violence.

We found the most common form of firearm-related death in the home to be suicide. Although previous authors have correlated regional suicide rates with estimates of firearm density,[15,16] the precise nature of the relation between gun availability and suicide is unclear.[1,17] The choice of a gun for suicide may involve a combination of impulse and the close proximity of a firearm. Conversely, the choice of a gun may simply reflect the seriousness of a person's intent. If suicides involving firearms are more a product of the easy availability of weapons than of the strength of intent, limiting access to firearms will decrease the rate of suicide. If the opposite is true, suicidal persons will only work harder to acquire a gun or kill themselves by other means. For example, although the elimination of toxic coal gas from domestic gas supplies in Great Britain resulted in a decrease in successful suicide attempts,[18] a similar measure in Australia was associated with increasing rates of suicide by other methods.[19]

A recent study of 30 survivors of attempts to commit suicide with firearms suggests that many of them acted on impulse.[20] Whether this observation applies to nonsurvivors as well is unknown. The recent acquisition of a firearm was noted in only eight of our cases, and we do not know how long before death any suicide victim planned his or her attempt. However, given the high case-fatality rate associated with suicide attempts involving firearms, it seems likely that easy access to guns increases the probability that an impulsive suicide attempt will end in death.[21]

Detectable concentrations of ethanol were found in the blood of a substantial proportion of the victims tested. This suggests that ethanol may be an independent risk factor for gunshot death.[22-25] Although this hypothesis is compatible with the known behavioral and physiologic effect of ethanol, the strength of this association remains to be defined.[25]

There are many reasons that people own guns. Unfortunately, our case files rarely identified why the firearm involved had been kept in the home. We cannot determine, therefore, whether guns kept for protection were more or less hazardous than guns kept for other reasons.

We did note, however, that handguns were far more commonly involved in gunshot deaths in the home than shotguns or rifles. The single most common reason for keeping firearms given by owners of handguns, unlike owners of shoulder weapons, is "self-defense at home."[1,4] About 45 percent of the gun-owning households nationally own handguns.[1] If the proportion of homes containing handguns in King County is similar to this national average, then these weapons were 2.6 times more likely to be involved in a gunshot death in the home than were shotguns and rifles combined.

Several limitations of this type of analysis must be recognized.[1,26] Our observations are based on a largely urban population and may not be applicable to more rural communities. Also, various rates of suicide and homicide have been noted in other metropolitan counties.[27] These differences may reflect variations in social and demographic composition as well as different patterns of firearm ownership.

Mortality studies such as ours do not include cases in which burglars or intruders are wounded or frightened away by the use or display of a firearm. Cases in which would-be intruders may have purposely avoided a house known to be armed are also not identified. We did not report the total number or extent of nonlethal firearm injuries involving guns kept in the home. A complete determination of firearm risks versus benefits would require that these figures be known.

Table 3. Classification of 398 Gunshot Deaths Involving a Firearm Kept in the Home.

Classification	No.	%	Relative Risk*
Self-protection homicide	9	2.3	1.0
Justifiable homicide	2	0.5	
Self-defense homicide	7	1.8	
Unintentional deaths	12	3.0	1.3
Criminal homicide	41	10.3	4.6
Suicide	333	83.7	37.0
Unknown	3	0.8	0.3

*Based on the number of self-protection homicides.

The home can be a dangerous place. We noted 43 suicides, criminal homicides, or accidental gunshot deaths involving a gun kept in the home for every case of homicide for self-protection. In the light of these findings, it may reasonably be asked whether keeping firearms in the home increases a family's protection or places it in greater danger. Given the unique status of firearms in American society and the national toll of gunshot deaths, it is imperative that we answer this question.

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