

THE TRUE FACTS ON FIREARMS LEGISLATION

THREE STATISTICAL STUDIES

This report, using *all* of the pertinent statistics available, is the first comprehensive study on a national basis ever made on the relationship of firearms to crime in the United States. Most of the statistics are from the Federal Bureau of Investigation.

1. In 1966, there were 3,243,370 serious crimes committed in the United States. Firearms of all types, including zip guns, gangster weapons and fake guns, were involved in 3.4% of these serious crimes. Rifles and shotguns were involved in less than one-half of one per cent (0.005).

2. Statistics show that there is no significant difference in crime rates between states that have firearms licensing laws and those that do not.

3. In general, as the proportion of the population possessing firearms goes down, crime rates go up. Statistics show that fewer people with guns do not mean less crime.

In all of the numerous hearings on firearms legislation in the past, only partial statistics have been used. Generally, a few statistics from thousands have been publicized to "prove" a position previously taken. Partial statistics, rather than complete statistics, have been used by proponents of restrictive firearms legislation at hearings before the Senate Subcommittee to Investigate Juvenile Delinquency, the Philadelphia City Council, New Jersey Legislature, New York City Council, Chicago City Council and others. The President's Commission on Law Enforcement and Administration of Justice used only partial statistics. Neither the U. S. Department of Justice nor the U. S. Department of the Treasury has ever made a comprehensive study using complete statistics.

On the subject of firearms legislation, the press has been fed a steady diet of partial statistics, and often statistics pulled out of context.

About 40,000,000 Americans own some sort of firearm. Obviously, legislation affecting this many people should not be enacted on partial statistics. In fact, it is a disservice to the public for partial statistics to be publicized regarding pending legislation. The public can easily be led to believe that the legislation, if passed, will accomplish much more than is possible.

Everyone agrees there should be reasonable controls on the ownership and use of firearms. Law enforcement agencies must have tools to control the misuse of firearms, and especially in times of civil disorders. At the same time, millions of law-abiding citizens must not be deprived of their rights to own and use firearms.

The three statistical studies are printed together as a convenience. They are documented and all sources are given. They should be of value to anyone concerned with firearms legislation. The studies were made by Alan S. Krug. They were started when he was a member of the research staff at The Pennsylvania State University. Mr. Krug has continued his research in his present position as assistant to the director at the National Shooting Sports Foundation.

Most of the material contained in the following three statistical studies has been introduced in the Congressional Record under the following titles:

THE MISUSE OF FIREARMS IN CRIME

— introduced in the Record by Senator Bourke B. Hickenlooper of Iowa on April 2, 1968.

THE RELATIONSHIP BETWEEN FIREARMS OWNERSHIP AND CRIME RATES: A STATISTICAL ANALYSIS

— introduced in the Record by Congressman Robert R. "Bob" Casey of Texas on January 30, 1968.

THE RELATIONSHIP BETWEEN FIREARMS LICENSING LAWS AND CRIME RATES

— introduced in the Record by Congressman John D. Dingell of Michigan on July 25, 1967.

THE MISUSE OF FIREARMS IN CRIME

Extent of the Problem

By

ALAN S. KRUG

March 12, 1968

INTRODUCTION

The need to prevent abuses in interstate firearms sales through realistic federal legislation has been recognized by the overwhelming majority of American sportsmen and other law-abiding firearms owners in the United States. All the major organizations representing these interests have endorsed proposals which are now pending before the Congress. Other groups have proposed measures which law-abiding firearms owners believe are overly restrictive and ineffective. It is generally agreed that enactment of any new firearms legislation will be realized only through mutual understanding between all interested parties. However, positive action is being blocked by the anti-gun faction's dissemination of false and misleading statistics on the subject of the misuse of firearms in crime. The use of such "doctored" material serves only to alienate those sportsmen who are familiar with the facts. By misleading much of the general public with manufactured material, the anti-gun faction contributes nothing to the constructive dialogue over firearms control. Rather, it drives the two positions farther apart.

FACT AND FANCY

One very misleading statistic that has been used in a number of emotionally charged anti-firearm newspaper editorials and magazine articles is that, in 1965, 17,000 Americans were "killed by guns." While these 17,000 deaths were represented to be murders committed with firearms, the actual number of criminal homicides involving firearms in that year was 5,634. The remainder of the 17,000 people who were "killed by guns" died through suicide (8,898) (21) and firearms accidents (2,200) (18).

Another statistic of anti-firearm writers is that "750,000 Americans have died since 1900 by means of firearms." Here again, the implication is that all of these people were murdered with guns. However, upon closer inspection, it is seen that this figure too includes deaths due to criminal homicide, firearms accidents and suicide. This particular statistic was originally manufactured by a New York City press agent to help sell an extremist anti-gun book. There are no reliable data available from any private or public source to substantiate it. J. Edgar Hoover, Director of the FBI, said in reference to the 750,000 "deaths" that "This Bureau does not have any reliable figures or estimates on the total number of Americans killed by firearms since 1900. We began compiling data on this subject in 1961, . . . (8)."

Data on the number of homicides in the United States involving firearms and explosives are available from the U.S. Department of Health, Education, and Welfare,

Public Health Service, for the years 1933 to 1966. Some data are available for the period 1910 to 1932, but only for "Death-registration States," and not for the entire United States. Data for homicides by type of weapon used are not available for any years prior to 1910 (11). In no case are the data disaggregated into deaths by firearms and deaths by explosives. A second deficiency in the data is that the homicides are not broken down into criminal homicides and justifiable homicides.

Unfortunately, such fabricated, misleading statistics influence not only the general public but individuals who are seriously interested in the question of the misuse of firearms in crime. This is well demonstrated by the recent testimony of Attorney General Ramsey Clark before a subcommittee of the U.S. House of Representatives. Both the 17,000 and the 750,000 figures were used by Attorney General Clark (5), who testified in favor of the enactment of H. R. 5384, the House version of Amendment 90 to S. 1, the current "Dodd bill." He made the amazing statements in regard to the 17,000 statistic that "Actually, we are unable to make a specific breakdown (as to those deaths which were the result of criminal activity and those that were due to accidents and suicide—ed.)," and "It may be that most of them (the 17,000 deaths—ed.) are the result of criminal acts."

These statements were made in spite of the fact that the number of criminal homicides involving firearms in 1965 was published by the Federal Bureau of Investigation, an agency of the U.S. Department of Justice, which Attorney General Clark heads (24). Both the number of accidental deaths and suicides involving firearms were available from the U.S. Public Health Service, U.S. Department of Health, Education and Welfare. In 1965, criminal homicides involving firearms totaled 5,634 (24), hardly "most of them."

When asked for a breakdown of the 750,000 figure, the attorney general said "I would assume that accidental death would be among the highest," (5, page 255). Actually, the number of accidental deaths by firearms is the lowest of the three categories of firearms deaths as mentioned above for each of the years for which data are available.

Thus, it can be seen that it is all too easy for statistics that have "popped up" in some popular article to be taken for scientific fact, when in truth they constitute little more than "gossip." Such situations as this represent a real threat to any attempt to present the problem of the misuse of firearms in a scientific light. The result can only be confusion, consternation and resentment on the part of those who are attempting to judge proposed firearms legislation.

FIREARM HOMICIDE 1910-1967

From 1910 until the present time, the firearm homicide rate in the United States has shown a decidedly downward trend. This is depicted in the graph of Figure 1, which is a time series of the national firearm homicide rate.¹ The trend line,² which was fitted to the data of the time series by the method of least squares,³ indicates that the magnitude of the problem of the misuse of firearms in homicides has been decreasing, not increasing, over the entire period for which data are available.

During this 57-year period in which the firearms homicide rate has shown this downward trend, the extent of firearms ownership in the United States has trended upward.⁴ These data are not at all consistent with a contention that firearms are a causative factor in homicides, but rather tend to refute such a view. Nor do the data suggest that the problem of the misuse of firearms in homicide is a new one which has suddenly appeared on the sociological horizon. Perhaps the increasingly efficient communications media of today are partly responsible for much of the public having this impression. While efforts must be made to solve the problem of the misuse of firearms in crime, the extent of the problem and its present status should be judged in terms of the entire period for which data are available. Only then can the problem be seen in its proper perspective and subjected to meaningful analysis.

FIREARMS IN CRIME: 1966

Firearms were misused in 3.4 percent of the 3,243,-370 serious crimes that were committed in the United States in 1966.^{5,6} Table 1 shows the relationship of firearms to other weapons used in the commission of serious crimes in that year.

Unfortunately, data breaking down this 3.4 per cent

¹ Series of successive observations of the same phenomenon over a period of time are called time series. In this case, the phenomenon is the annual firearm homicide rate in the United States.

² The secular trend is that characteristic of a time series which extends consistently throughout the entire period of time under consideration, and is represented by the trend line.

³ For a simplified explanation of the "method of least squares," used for determining the trend line, see *Introduction to Probability and Statistics* (1) or *Introduction to Statistical Analysis* (7).

⁴ At the end of 1966, it is estimated that between 40 and 50 million persons in the United States owned some 200 million firearms of all types. For a treatise on the socio-economics of firearms in the United States, see *The Socio-economic Impact of Firearms in the Field of Conservation and Natural Resources Management* (17).

into (1) gangster weapons as classified under the National Firearms Act of 1934, (2) "zip guns," (3) toy guns, (4) alleged guns,⁷ (5) pistols and revolvers, and (6) rifles and shotguns are not available (10). Therefore, just what the role of each is in the total picture of the misuse of firearms in crime can only be estimated. It is possible to say that the percentage of serious crimes in which non-gangster type firearms are involved is less than the 3.4 per cent figure, and that handguns, including zip guns, are the most frequently misused type of firearm.

It is known, for example, that in 1966, pistols and revolvers, including zip guns, were involved in 72.7 per cent of all firearms homicides, rifles in 11.4 per cent, and shotguns in 15.9 per cent (6).⁸ The latter two categories, of course, include an unknown number of gangster-type weapons, i.e. "sawed-off" rifles and shotguns and machine guns.

According to Prosecuting Attorney William L. Cahalan's testimony before the Senate Subcommittee to Investigate Juvenile Delinquency in July of 1967, Detroit Police Department statistics indicate that 95 per cent of all gun armed robberies in that city are with handguns (4).

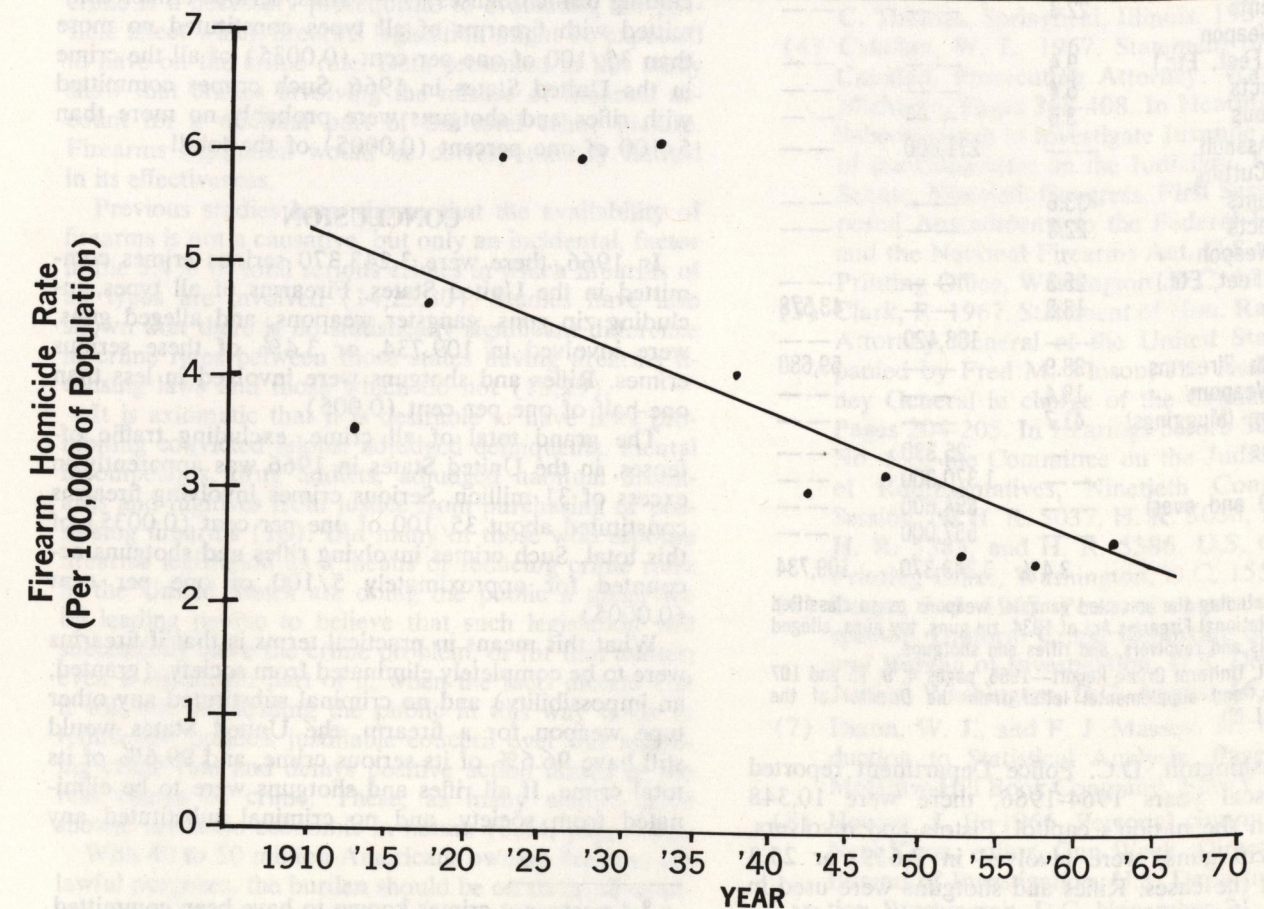
⁵ Total serious crime as defined by the FBI in the Uniform Crime Reports is (1) murder and non-negligent manslaughter; (2) forcible rape; (3) robbery; (4) aggravated assault; (5) burglary; (6) larceny (\$50 and over); and (7) auto theft (23, page 4). Murder and non-negligent manslaughter, aggravated assault and robbery are the three specific crime categories in which firearms are sometimes misused.

⁶ FBI crime data for 1966 are the latest available (23).

⁷ If, for example, a man holds up a store by keeping his hand in his coat pocket in such a way as to indicate he has a gun, the robbery will be recorded as involving a firearm, even if no gun is ever actually seen by any of the persons involved in the holdup. The number of such cases is apparently significant. In 1966, 10.1 per cent of all robberies in New York City which involved firearms were committed with toy or alleged guns. By comparison, rifles, shotguns and machine guns were involved in only 2.3 percent (13).

⁸ Although the 1966 FBI Uniform Crime Report erroneously reported "firearms used to commit more than 6,500 murders" in 1966 (23, page 1), firearms were involved in 6,476 criminal homicides, or 59.3 per cent of the total number committed (23, page 107). This 59.3 per cent figure was incorrectly rounded to 60 per cent (23, page 6). The error was apparently the result of a second incorrectly rounded figure of 44 per cent for the per cent of murders committed with handguns (23, page 7). The latter was actually 43.1 and should have been rounded to 43.

Figure 1. Trend of the firearm homicide rate in the United States: 1910-1966.^{1,2}



¹ Data for 1910-1932 are for "Death-registration States" only; data for 1933-1966 are for the entire United States (22).

² The trend line was constructed from the annual data for the period 1910-1966. The dots represent the average firearm homicide rate for each five-year period 1911-1965 (See Appendix Table 1).

Source: Public Health Service, U.S. Department of Health, Education, and Welfare (1910-1960); Federal Bureau of Investigation, U.S. Department of Justice (1961-1966).

Table 1. Relationship of Firearms¹ to Other Weapons Used in the Commission of Serious Crimes, 1966

	PER CENT OF WEAPONS USED	TOTAL CRIMES COMMITTED	CRIMES IN WHICH FIREARMS WERE USED
Homicide	—	10,920	—
Firearms	59.3	—	6,476
Knives or Cutting Instruments	22.3	—	—
Personal Weapon (Hands, Feet, Etc.)	9.4	—	—
Blunt Objects	5.4	—	—
Miscellaneous	3.6	—	—
Aggravated Assault	—	231,800	—
Knives or Cutting Instruments	33.6	—	—
Blunt Objects	22.3	—	—
Personal Weapon (Hands, Feet, Etc.)	25.3	—	—
Firearms	18.8	—	43,578
Robbery	—	153,420	—
Armed with Firearms	38.9	—	59,680
Other Weapons	19.4	—	—
Strong Arm (Muggings)	41.7	—	—
Forcible Rape	—	25,330	—
Burglary	—	1,370,300	—
Larceny (\$50 and over)	—	894,600	—
Auto Theft	—	557,000	—
TOTAL	3.4%	3,243,370	109,734

¹Firearms including the so-called gangster weapons as so classified under the National Firearms Act of 1934, zip guns, toy guns, alleged guns, pistols and revolvers, and rifles and shotguns.

Source: F.B.I. Uniform Crime Report—1966, pages 4, 9, 15 and 107 (23), and supplemental letter from the Director of the F.B.I. (9).

The Washington, D.C. Police Department reported that, in fiscal years 1964-1966, there were 10,348 robberies in the nation's capitol. Pistols and revolvers, including zip guns, were involved in 2,619, or 25.3 per cent of the cases. Rifles and shotguns were used in 89, or less than one per cent of the robberies. Of the total number of robberies which involved firearms, 96.7 per cent were committed with pistols and revolvers and 3.3 per cent with rifles and shotguns (26,27,28).

FBI and New York City Police Department Statistics show that there were 23,539 robberies in the city of New York in 1966. Handguns were used in 23.4 per cent of these robberies and rifles, shotguns and machine guns in 0.6 per cent. Of the total number of robberies committed with all types of firearms, those committed with rifles, shotguns and machine guns constituted 2.3 per cent.

In all probability, these figures are similar to those encountered in other cities, as by and large, holdups are committed with concealable weapons.

These data indicate that of all the serious crimes which occurred in the United States in 1966, less than one half of one per cent (0.005) involved rifles and shotguns.

In addition to the 3,243,370 serious crimes known to have been committed in 1966, there were nearly six million arrests⁹ for assaults, embezzlement and fraud, forgery and counterfeiting, arson, violation of narcotic drug laws, vandalism, vice and other crimes excluding traffic violations (23, page 114). With the number of such crimes amounting to more than four times the number of arrests made (23, page 102), the total number of crimes committed in the United States in 1966 was apparently no less than a staggering 31 million (excluding traffic offenses)!^{10,11} Thus, serious crimes committed with firearms of all types constituted no more than 35/100 of one per cent (0.0035) of all the crime in the United States in 1966. Such crimes committed with rifles and shotguns were probably no more than 5/100 of one percent (0.0005) of the total!

CONCLUSION

In 1966, there were 3,243,370 serious crimes committed in the United States. Firearms of all types, including zip guns, gangster weapons, and alleged guns, were involved in 109,734, or 3.4% of these serious crimes. Rifles and shotguns were involved in less than one-half of one per cent (0.005).

The grand total of all crime, excluding traffic offenses, in the United States in 1966 was apparently in excess of 31 million. Serious crimes involving firearms constituted about 35/100 of one per cent (0.0035) of this total. Such crimes involving rifles and shotguns accounted for approximately 5/100 of one per cent (0.0005).

What this means in practical terms is that if firearms were to be completely eliminated from society, (granted, an impossibility) and no criminal substituted any other type weapon for a firearm, the United States would still have 96.6% of its serious crime, and 99.6% of its total crime. If all rifles and shotguns were to be eliminated from society, and no criminal substituted any

⁹ Arrests, not crimes known to have been committed. The total number of crimes committed has not been reported, and must be imputed from the arrest figures. In 1966, the FBI received reports of 4,144,445 arrests for such crimes from 4,042 agencies representing a population of 137,986,000. For the entire population of 195,857,000, a total arrest figure of 5,880,967 can be imputed.

¹⁰ The per cent of offenses cleared by arrest in 1966 was 24.3 for serious crimes, and 21.1 for other crimes, excluding traffic offenses. A clearance of 21.1 per cent for 27,871,800 crimes would account for 5,880,967 arrests as noted above. With 3,243,370 serious crimes having been committed, the grand total for all crimes, excluding traffic offenses, would be 31,115,170. This, of course, does not account for any unreported crime.

¹¹ Crime reports measure the number of crimes, not the number of criminals. The number of criminals is substantially less than the number of crimes committed.

other type of weapon for them, the United States would still have at least 99.5% of its serious crime and at least 99.9% of all its crime. The fact that criminals do substitute other weapons for commercially-manufactured firearms is obvious, and has been well documented (2,15,19,20,25,30). For example, the use of homemade zip guns exceeded the misuse of rifles and shotguns in murders, robberies, and assaults in New York state in 1966 (12).¹²

Measuring the extent of the misuse of firearms in crime is a necessary prerequisite to evaluating the possible effect which firearms legislation might be expected to have on the crime rate. Data presented in this study show that crimes involving the misuse of firearms account for a minimal part of the total crime picture. Firearms legislation would be correspondingly limited in its effectiveness.

Previous studies have shown that the availability of firearms is not a causative, but only an incidental, factor in the 3.4% of total serious crimes in which firearms of all types are involved (14,25,30). Studies have also shown that there is no statistically significant difference in crime rates between those states having firearms licensing laws and those which do not (15,29).

It is axiomatic that it is desirable to have laws prohibiting convicted felons, adjudged delinquents, mental incompetents, drug addicts, adjudged habitual drunkards and fugitives from justice from purchasing or possessing firearms (16). But many of those who espouse firearms legislation as a means of reducing crime rates in the United States are doing the public a disservice by leading people to believe that such legislation will successfully solve the crime problem, or for that matter, even a significant part of it, when the facts dictate that it will not. Misleading the public in this way tends to reduce the public's justifiable concern over our alarming crime rate and delays positive action aimed at the real causes of crime. These, as many studies have shown, are socio-economic in nature (3,24, page VII).

With 40 to 50 million Americans owning firearms for lawful purposes, the burden should be on those advocating restrictive firearms legislation to show that the legislation they propose is an effective means of preventing crime and reducing crime rates. Proof in the way of scientific evidence, duly treated by proper statistical methods, should be required. Emotional arguments based on personal opinion or political expediency should be rejected. Benefits, if any, to be gained from firearms legislation should be judged both in terms of the financial cost to the community and in terms of the subsequent loss of personal freedom and individual civil rights.

¹² The Joint Legislative Committee on Crime, Its Causes, Control, and Effect on Society of the New York state legislature reported that in 1966, murders, robberies, and assaults with rifles and shotguns in New York state totaled 705, while zip guns were involved in 976 such incidents (12).

BIBLIOGRAPHY

- (1) Alder, H. L., and E. B. Roessler. 1964. Introduction to probability and statistics. Pages 160-167. W. H. Freeman and Company, San Francisco and London. 313 pp.
- (2) Anonymous. 1958. A teen-age gang leader's brutal tale (zip-gun armies at war). Life Magazine, 44(15):126-140.
- (3) Bensing, R. C., and O. Schroeder. 1960. Homicide in an urban community. Page 184. Charles C. Thomas, Springfield, Illinois. 193 pp.
- (4) Cahalan, W. L. 1967. Statement of William L. Cahalan, Prosecuting Attorney, Wayne County, Michigan. Pages 368-408. In Hearings before the Subcommittee to Investigate Juvenile Delinquency of the Committee on the Judiciary, United States Senate, Ninetieth Congress, First Session, on Proposed Amendments to the Federal Firearms Act and the National Firearms Act. U.S. Government Printing Office, Washington, D.C. 1186 pp.
- (5) Clark, R. 1967. Statement of Hon. Ramsey Clark, Attorney General of the United States; accompanied by Fred M. Vinson, Jr., Assistant Attorney General in charge of the Criminal Division. Pages 204-205. In Hearings before Subcommittee No. 5 of the Committee on the Judiciary, House of Representatives, Ninetieth Congress, First Session, on H. R. 5037, H. R. 5038, H. R. 5384, H. R. 5385, and H. R. 5386. U.S. Government Printing Office, Washington, D.C. 1551 pp.
- (6) Daunt, J. J. 1967. Personal communication. Inspector, Uniform Crime Reporting Section, Federal Bureau of Investigation, U.S. Department of Justice, Washington, D.C. August 16.
- (7) Dixon, W. J., and F. J. Massey, Jr. 1957. Introduction to Statistical Analysis. Pages 189-193. McGraw-Hill Book Company, New York. 488 pp.
- (8) Hoover, J. E. 1966. Personal communication to Neal Knox, editor, Gun Week. Director, Federal Bureau of Investigation, U.S. Department of Justice, Washington, D.C. November 21.
- (9) ———. 1966. Personal communication to Hon. Roman L. Hruska, a United States Senator from the State of Nebraska. July 29. See Congressional Record, 112(135):5.
- (10) ———. 1965. Personal communication. May 27.
- (11) Israel, R. A. 1967. Personal communication. Chief, Mortality Statistics Branch, Division of Vital Statistics, Public Health Service, U.S. Department of Health, Education, and Welfare, Washington, D.C. June 28.
- (12) Joint Legislative Committee on Crime, Its Causes, Control, and Effect on Society of the New York State Legislature. 1967. Excerpts (regarding guns) from 12-15-67 report of Joint Legislative Committee on Crime, Its Causes, Control, and Effect on Society. New York State Legislature, Albany. 2 pp.

- (13) Joint Public Hearing on Firearms Control. 1967. Staff notes. Pages 5-8. Joint Legislative Committee on Crime, Its Causes, Control and Effect on Society; Subcommittee on Firearms Control of the City Affairs Committee of the City Council of the City of New York. City Hall, New York, N.Y. 29 pp. mimeo.
- (14) Krug, A. S. 1968. The relationship between firearms ownership and crime rates: a statistical analysis. Congressional Record, 114(12):H570-H572.
- (15) _____. 1967. A statistical study of the relationship between firearms licensing laws and crime rates. Appendix C of Statement of Mark K. Benenson. Pages 695-705. In Hearings Before the Subcommittee to Investigate Juvenile Delinquency of the Committee on the Judiciary, United States Senate, Ninetieth Congress, First Session, on Proposed Amendments to the Federal Firearms Act. U.S. Government Printing Office, Washington, D.C. 1186 pp. Also in Congressional Record, 113(115):H9366-H9370.
- (16) _____. 1966. Model firearms legislation for the conservation action agency. Pages 236-246. Proc. 20th Ann. Mtg. of the S. E. Assoc. of Game and Fish Comm., Asheville, N.C.
- (17) _____. 1965. The socio-economic impact of firearms in the field of conservation and natural resources management. Pages 70-78. Proc. 19th Ann. Mtg. of the S. E. Assoc. of Game and Fish Comm., Tulsa, Oklahoma.
- (18) National Safety Council. 1966. Accident facts 1966 edition. Page 7. National Safety Council, Chicago, Illinois. 97 pp.
- (19) Page, W. 1959. Guns from the jungle. Field & Stream, 64(11):136-140.
- (20) Shead, W. C. 1958. Do laws requiring registration of privately owned firearms lower murder rate? S. Tex. Law J., 3(4):317-331.
- (21) U.S. Department of Health, Education, and Welfare, Public Health Service, National Center for Health Statistics. 1966. Vital statistics of the United States—1965. U.S. Department of Health, Education, and Welfare, Washington, D.C.
- (22) _____. 1950. History and organization of the vital statistics system. Vital Statistics of the United States, Vol. 1:2-19.
- (23) U.S. Department of Justice, Federal Bureau of Investigation. 1967. Uniform crime reports—1966. U.S. Government Printing Office, Washington, D.C. 185 pp.
- (24) _____. 1966. Uniform crime reports—1965. Pages 3,106. U.S. Government Printing Office, Washington, D.C. 192 pp.
- (25) Walmer, J. D. 1967. Comments made during an interview on radio station WMAJ, State College, Pa. Medical director, Rehabilitation Education Program, The Pennsylvania State University, University Park. October 25.

- (26) Washington, D.C. Metropolitan Police Department. 1967. Annual report: fiscal year 1966. Page 61. Metropolitan Police Department, Washington, D.C. 77 pp.
- (27) _____. 1966. Annual report: fiscal year 1965. Page 59. Metropolitan Police Department, Washington, D.C. 75 pp.
- (28) _____. 1965. Annual report: fiscal year 1964. Metropolitan Police Department, Washington, D.C.
- (29) Wisconsin Legislative Reference Library. 1960. The regulation of the firearms by the states. Research bull. 130. Wisconsin Legislative Reference Library, Madison. 34 pp.
- (30) Wolfgang, M. E. 1958. Patterns in criminal homicide. Pages 79-83. Oxford University Press, London, Bombay, and Karachi. 413 pp.

Appendix Table 1. Firearm homicide rates in the United States: 1910-1966.¹

Year	Rate	Year	Rate	Year	Rate
1910	2.5	1931	6.2	1951	2.5
		1932	6.1	1952	2.7
1911	3.2	1933	6.3	1953	2.5
1912	3.2	1934	6.1	1954	2.5
1913	3.6	1935	5.1	1955	2.3
1914	3.9	Avg.	6.0	Avg.	2.5
1915	3.6				
Avg.	3.5	1936	4.7	1956	2.4
		1937	4.4	1957	2.3
1916	4.0	1938	3.9	1958	2.4
1917	4.6	1939	3.7	1959	2.5
1918	4.4	1940	3.5	1960	2.6
1919	5.1	Avg.	4.0	Avg.	2.4
1920	4.8				
Avg.	4.6	1941	3.4	1961	2.5
		1942	3.1	1962	2.4
1921	5.9	1943	2.5	1963	2.5
1922	5.8	1944	2.5	1964	2.6
1923	5.6	1945	2.9	1965	2.9
1924	5.8	Avg.	2.9	Avg.	2.6
1925	5.8				
Avg.	5.8	1946	3.5	1966	3.3
		1947	3.4		
1926	5.8	1948	3.3		
1927	5.6	1949	2.8		
1928	5.9	1950	2.8		
1929	5.5	Avg.	3.2		
1930	6.0				
Avg.	5.8				

¹Data for 1910-1932 are for "Death-registration States" only; data for 1933-1966 are for the entire United States (11).

Source: Public Health Service, U.S. Department of Health, Education and Welfare (1910-1960); Federal Bureau of Investigation, U.S. Department of Justice (1961-1966).



United States
of America

Congressional Record

PROCEEDINGS AND DEBATES OF THE 90th CONGRESS, FIRST SESSION

Vol. 113

Washington, Tuesday, July 25, 1967

No. 115

The Relationship Between Firearms Licensing Laws and Crime Rates

A Statistical Study of the Relationship Between Firearms Licensing Laws and Crime Rates

Mr. DINGELL. Mr. Speaker, the first comprehensive statistical study ever made on the relationship of firearms availability to crime with firearms has just come to my attention. It is an evaluation of the effectiveness of licensing laws in the 36 States which regulate the acquisition and/or carrying of firearms by determining the correlation, if any, between these laws and crime rates in the various States.

The study begins with the hypothesis: States with firearms licensing laws have lower crime rates than States not having such laws. The result of the study was a rejection of the hypothesis and a conclusion that there "is no statistically significant difference in crime rates between States that have firearms licensing laws and those that do not."

I believe the following study points out important facts that must be borne in mind in the consideration of restrictive firearms legislation:

A STATISTICAL STUDY OF THE RELATIONSHIP BETWEEN FIREARMS LICENSING LAWS AND CRIME RATES

By Alan S. Krug, economist, Regional Analysis Center, Institute for Research on Land and Water Resources, The Pennsylvania State University, University Park, Pa. March 27, 1967.

Thirty-six of the fifty states regulate the acquisition and/or carrying of firearms¹ by some form of licensing or prohibition, presumably with a view to prevent the misuse of firearms in crime. An evaluation of the effectiveness of these licensing laws necessarily entails a statistical analysis to determine the correlation, if any, between the licensing laws and crime rates in the various states.

¹For the most part, "handguns."

A rather comprehensive study on the possible relationship of firearms legislation (regulation) and crime rates was accomplished by the Wisconsin Legislative Reference Library for the Wisconsin State Legislature in 1960 (19). The results of this study indicated that there is no demonstrable correlation between firearms regulations and crime rates. The study noted that other factors, such as geography, homogeneity of population, density of population, median school years completed, and per capita personal income, do appear to be significantly related to crime rates. The study also noted, interestingly, that firearms legislation (regulation) does seem to be related to a "great deal of paper work, particularly on the part of the retailer."

In the present study, current data have been analyzed by statistical methods in order to ascertain if there is any statistically-significant difference in crime rates for the license and non-license states at the present time.

Table 1 shows the level of licensing in the 36 license states:

TABLE 1. LEVEL OF LICENSING IN THE 36 LICENSE STATES

State	Manufacturer	Wholesaler	Retailer	Person possessing	Person purchasing	Person carrying	State	Manufacturer	Wholesaler	Retailer	Person possessing	Person purchasing	Person carrying
Alabama			X		X ¹	X	Nevada						X
California			X		X ¹	X	New Hampshire			X			X
Colorado						X	New Jersey			X		X	X
Connecticut			X		X ¹	X	New York			X	X	X	X ⁴
Delaware			X			X	North Carolina			X		X	X ⁴
Florida					X ¹	X	North Dakota			X ¹			X
Georgia		X	X		X ¹	X	Oregon			X		X ¹	X
Hawaii	X		X	X ¹	X	X	Pennsylvania			X		X ¹	X
Idaho			X		X	X	Rhode Island			X		X ¹	X
Indiana			X		X ¹	X	South Carolina ¹⁰			X		X	X ¹¹
Iowa			X		X ¹	X	South Dakota			X		X	X
Louisiana		X	X		X ¹	X ¹	Tennessee			X		X ¹	X ⁶
Maine						X	Texas		X	X		X	X ⁶
Massachusetts			X		X	X	Utah			X		X ¹²	X
Michigan			X		X	X	Virginia			X ¹		X ¹³	X
Mississippi			X	X ¹	X	X	Washington			X		X	X
Missouri					X	X	West Virginia			X		X	X
Montana						X	Wyoming						X

¹No permit to purchase, but administrative procedure of required waiting period between purchase and delivery of a handgun constitutes the equivalent of such a permit.

²Jacksonville and Miami.

³Columbus and Savannah.

⁴Hawaii requires the registration of all handguns with the police.

⁵New Orleans.

⁶No license to carry required, but carrying of a handgun concealed on the person is prohibited.

⁷Mississippi requires all firearms having a muzzle velocity of more than 2,000 feet per second to be registered with the county sheriff.

⁸Optional by cities or counties.

⁹Philadelphia bill 560-A requires a license to purchase any firearm (rifle, shotgun, or pistol).

¹⁰South Carolina law forbids any person, firm, or corporation to "manufacture, sell, offer for sale, lease, rent, barter, exchange or transport for sale into this State any pistol."

¹¹Carrying prohibited.

¹²Salt Lake City.

¹³Virginia requires a permit to purchase a handgun in counties having a population density of more than 1,000 per square mile. The cities of Arlington, Norfolk and Richmond also require such a permit.

Source: Individual State and local statutes.

CONGRESSIONAL RECORD

In connection with the licensing of firearms dealers and purchasers, it is to be noted that all firearms dealers, regardless of their state of residence, must keep complete records of all transactions as required by the Secretary of the Treasury under the provisions of the *Federal Firearms Act of 1938* (United States Code, Title 15, Chapter 18). These records must include the make, model, type, calibre or gauge, and serial number, if any, of each and every firearm (rifle, shotgun or pistol) received or sold, the date such firearm was received or sold, and the name and address of the person or business from whom the firearm was received, or to whom the firearm was sold, as the case may be (18).

In addition to these records, which must be kept for ten years from the date of the transaction and made available to law-enforcement officers upon request, there are certain records which must be maintained under the firearms laws of several of the states. In most cases, however, the latter merely duplicate the former.

Table 2 presents data on murder and non-negligent manslaughter for each of the licensing and non-licensing states. Tables 3 and 4 present similar data for the crimes of robbery and aggravated assault, respectively. These are the three crime categories in which the misuse of a firearm may be involved.

Table 5 depicts the rate of "serious crimes," as defined by the F.B.I., for each of the fifty states (17). These are (1) homicide; (2) forcible rape; (3) robbery; (4) aggravated assault; (5) burglary; (6) larceny (\$50 and over); and (7) auto theft.

TABLE 2. *Murder and nonnegligent manslaughter rates,¹ by State: 1965*

License States:	
Alabama	11.4
California	4.7
Colorado	3.5
Connecticut	1.6
Delaware	5.1
Florida	8.9
Georgia	11.3
Hawaii	3.2
Idaho	2.0
Indiana	3.5
Iowa	1.3
Louisiana	8.1
Maine	2.1
Massachusetts	2.4
Michigan	4.4
Mississippi	8.9
Missouri	6.7
Montana	1.7
Nevada	8.4
New Hampshire	2.7
New Jersey	3.2
New York	4.6
North Carolina	7.9
North Dakota	.9
Oregon	3.4
Pennsylvania	3.5
Rhode Island	2.1
South Carolina	9.6
South Dakota	1.6
Tennessee	8.0

272-024-9110

TABLE 2. *Murder and nonnegligent manslaughter rates,¹ by State: 1965—Continued*

License States—Continued	
Texas	7.5
Utah	1.5
Virginia	6.6
Washington	2.2
West Virginia	4.0
Wyoming	2.9
Mean	4.8
Nonlicense States:	
Alaska	6.3
Arizona	5.0
Arkansas	5.9
Illinois	5.2
Kansas	2.7
Kentucky	5.3
Maryland	6.7
Minnesota	1.4
Nebraska	2.4
New Mexico	6.1
Ohio	3.6
Oklahoma	4.4
Vermont	.5
Wisconsin	1.5
Mean	4.1

¹ Offenses per 100,000 of population.

Source: FBI Uniform Crime Report 1965 pp. 56-70.

TABLE 3.—*Robbery rates¹ by State: 1965*

License States:	
Alabama	28.7
California	113.3
Colorado	54.5
Connecticut	19.3
Delaware	54.9
Florida	88.6
Georgia	29.8
Hawaii	18.7
Idaho	10.1
Indiana	55.9
Iowa	12.8
Louisiana	51.3
Maine	4.0
Massachusetts	40.0
Michigan	102.6
Mississippi	14.4
Missouri	93.3
Montana	15.9
Nevada	97.5
New Hampshire	6.9
New Jersey	55.4
New York	61.3
North Carolina	21.6
North Dakota	4.6
Oregon	46.0
Pennsylvania	51.4
Rhode Island	19.0
South Carolina	21.4
South Dakota	9.2
Tennessee	28.6
Texas	42.0
Utah	23.1
Virginia	38.5
Washington	30.3
West Virginia	14.4

TABLE 3. *Robbery rates,¹ by State: 1965 Continued*

License States Continued	
Wyoming	17.9
Mean	38.8
Nonlicense States:	
Alaska	39.9
Arizona	55.7
Arkansas	23.7
Illinois	164.8
Kansas	24.0
Kentucky	36.7
Maryland	83.0
Minnesota	40.3
Nebraska	21.9
New Mexico	42.7
Ohio	51.6
Oklahoma	38.0
Vermont	4.5
Wisconsin	11.5
Mean	45.6

¹ Offenses per 100,000 of population.

Source: FBI Uniform Crime Report 1965 pp. 56-70.

TABLE 4.—*Aggravated assault rate¹ by State: 1965*

License States:	
Alabama	149.1
California	142.9
Colorado	78.6
Connecticut	43.5
Delaware	28.1
Florida	188.6
Georgia	147.0
Hawaii	46.3
Idaho	53.6
Indiana	62.8
Iowa	20.1
Louisiana	132.6
Maine	30.4
Massachusetts	50.7
Michigan	129.8
Mississippi	139.9
Missouri	117.4
Montana	47.5
Nevada	95.2
New Hampshire	11.7
New Jersey	86.3
New York	117.5
North Carolina	216.4
North Dakota	23.6
Oregon	59.3
Pennsylvania	72.0
Rhode Island	53.6
South Carolina	134.9
South Dakota	41.4
Tennessee	91.1
Texas	137.2
Utah	56.0
Virginia	133.9
Washington	60.4
West Virginia	55.4
Wyoming	43.2
Mean	86.1

Footnote at end of tables.

TABLE 4. *Aggravated assault rate¹ by State: 1965—Continued*

Nonlicense States:	
Alaska	85.0
Arizona	113.9
Arkansas	95.9
Illinois	136.7
Kansas	71.2
Kentucky	60.4
Maryland	181.5
Minnesota	39.5
Nebraska	28.2
New Mexico	129.2
Ohio	60.7
Oklahoma	77.7
Vermont	10.8
Wisconsin	29.5
Mean	80.0

¹ Offenses per 100,000 of population.

Source: FBI Uniform Crime Report 1965 pp. 56-70.

TABLE 5. *Total offense (serious crime) rate¹ by State: 1965*

License States:	
Alabama	1067.9
California	2643.5
Colorado	1544.3
Connecticut	1175.1
Delaware	1287.6
Florida	2010.9
Georgia	1199.7
Hawaii	1890.1
Idaho	927.3
Indiana	1217.9
Iowa	706.5
Louisiana	1184.0
Maine	680.0
Massachusetts	1507.3
Michigan	1734.8
Mississippi	690.8
Missouri	1602.5
Montana	1082.7
Nevada	2395.7
New Hampshire	610.5
New Jersey	1396.6
New York	1608.2
North Carolina	980.0
North Dakota	501.7
Oregon	1486.9
Pennsylvania	968.8
Rhode Island	1417.9
South Carolina	1096.8
South Dakota	632.4
Tennessee	1082.9
Texas	1403.9
Utah	1394.3
Virginia	1158.6
Washington	1363.4
West Virginia	528.8
Wyoming	1001.6
Mean	1255.1

Nonlicense States:

Alaska	1709.9
Arizona	1934.5
Arkansas	739.9
Illinois	1613.1
Kansas	996.5

272-024-9110

CONGRESSIONAL RECORD

TABLE 5. *Total offense (serious crime) rate¹ by State: 1965 Continued*

Nonlicense States—Continued	
Kentucky	1051.6
Maryland	1718.2
Minnesota	1150.3
Nebraska	851.5
New Mexico	1514.4
Ohio	1038.7
Oklahoma	1150.0
Vermont	579.4
Wisconsin	737.6
Mean	1199.0

¹ Offenses per 100,000 of population.

Source: FBI Uniform Crime Report 1965 pp. 56-70.

All of the data in Tables 2 through 5 were taken from the 1965 F.B.I. Uniform Crime Report (17, pages 56-70), and are the latest available.

STATISTICAL ANALYSIS

The statistical hypothesis to be tested in this study is: *States with firearms licensing laws have lower crime rates than states not having such laws.*

TABLE 6. SUMMATION OF RESULTS: STATISTICAL ANALYSIS OF CRIME RATES FOR LICENSING AND NONLICENSING STATES, 1965					
	Licensing States	Nonlicensing States	Difference	t-value	Is difference statistically significant?
Arithmetic means:					
Homicide rate	4.8	4.1	0.7		
Robbery rate	38.8	45.6	-6.8	0.6618	
Aggravated assault rate	86.1	80.0	6.1		
Serious crime rate	1,255.1	1,199.0	56.1		

The formula for s is

$$s = \sqrt{\frac{\sum X^2 - \frac{(\sum X)^2}{N_1} + \sum Y^2 - \frac{(\sum Y)^2}{N_2}}{N_1 + N_2 - 2}}$$

where X and Y are the variates of the licensing and non-licensing states, respectively, and the term $N_1 + N_2 - 2$ constitutes the number of degrees of freedom. Alder and Roessler define the latter as (1): "the maximum number of variates which can freely be assigned (i.e., calculated or assumed) before the rest of the variates are completely determined; that is, it is the total number of variates minus the number of independent relationships existing among them."

The number of degrees of freedom is ordinarily designated by v.

Substitution of the robbery data into these formulae yields a value for t/ of 0.6618. For $v=48$, $t_{.1}=1.679$. Since $t/ = 0.6618$, which is less than 1.679, we conclude that the probability of selecting from two populations with identical means and identical standard deviations two samples whose means differ by more than 6.8 (in absolute value) is considerably more than 10%, which indicates that the result is not significant. Therefore, the difference between mean robbery rates of the license states and the non-license states is not sufficient to warrant the conclusion that one is lower than the other.

The mean crime rates for the various crime categories are listed in Table 6. It is immediately apparent that in the cases of murder, aggravated assault, and serious crime, the states with firearms licensing laws do not have lower crime rates than the non-licensing states. However, in order to test the hypothesis in terms of the robbery rates, it is necessary to apply a "t-test" (Student's t-Distribution) to determine if the difference in mean robbery rates for the licensing and non-licensing states is statistically significant or is merely due to random variation (chance).

The formula for the appropriate "t-test" is

$$t = \frac{\bar{X} - \bar{Y}}{s \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$$

where \bar{X} is the mean crime rate of the licensing group of states, \bar{Y} is the mean crime rate of the non-licensing group, N_1 is the number of licensing states, N_2 is the number of non-licensing states, and s is the "pooled estimate of the standard deviation" (the assumption is here made that the two groups of states have unknown, albeit identical standard deviations).

These results indicate that the statistical hypothesis *States with firearms licensing laws have lower crime rates than states not having such laws* must be rejected.

DISCUSSION

Statistical analysis of F.B.I. crime data reveals no significant difference in crime rates between states which have firearms licensing laws and those which do not. In all probability, there are a number of interacting forces which define this situation.

Table 7 shows the relationship of firearms to other weapons used in the commission of serious crimes in the United States in 1965. Crimes in which firearms were misused constitute only three percent of the total. In view of this, laws which were designed to reduce the misuse of firearms in crime could not, from a statistical standpoint, have an appreciable influence on the overall crime rate, even if such laws were highly effective. The degree of effectiveness of these firearms laws would, of course, determine the extent to which they might eliminate crimes included in the three-percent figure (7).

In 1965, firearms were misused in 57 percent of all homicides, 17 percent of all aggravated assaults, and 38 percent of all robberies (Table 7).

Perhaps the most detailed study of homicide that has been accomplished to date is that of Professor Marvin E. Wolfgang, Gra-

duate Chairman of the Department of Sociology at the University of Pennsylvania. Dr. Wolfgang's study dealt with the 588 criminal homicides which occurred in the city of Philadelphia, Pennsylvania, between January 1, 1948, and December 31, 1952.

One segment of the work dealt with the weapons which offenders used in carrying out their acts of criminal homicide. The results of this study led Dr. Wolfgang to conclude:

TABLE 7.—RELATIONSHIP OF FIREARMS¹ TO OTHER WEAPONS USED IN THE COMMISSION OF SERIOUS CRIMES, 1965

	Percent of weapons used	Total crimes committed	Crimes in which firearms were used
Homicide.....		9,850	
Firearms.....	57		5,634
Knives or cutting instruments.....	23		
Personal weapon (hands, feet, etc.).....	10		
Blunt objects.....	6		
Miscellaneous (unknown).....	4		
Aggravated assault.....		206,700	
Knives or cutting instruments.....	36		
Blunt objects.....	22		
Personal weapon (hands, feet, etc.).....	25		
Firearms.....	17		35,139
Miscellaneous.....			
Robbery.....		118,920	
Armed with.....			
Firearms.....	38		45,190
Other weapon.....	20		
Strong arm (muggings).....	42		
Forcible rape.....		22,470	
Burglary.....		1,173,200	
Larceny (\$50 and over).....		762,400	
Auto theft.....		486,600	
Total.....		2,790,000	85,963
Total, firearms ¹	3		

¹Firearms including the so-called gangster weapons as so classified under the National Firearms Act of 1934. Unfortunately, data breaking down firearms into gangster weapons or sporting firearms is not available (5).

Source: FBI Uniform Crime Report 1965, pp 3, 6, 8, and 10 (17), and supplemental letter from the Director of the FBI (4).

"It is probably safe to contend that many homicides occur only because there is sufficient motivation or provocation, and that the type of method used to kill is merely an accident of availability; that a gun is used because it is in the offender's possession at the time of incitement, but that if it were not present, he would use a knife to stab, or fists to beat his victim to death.

"The world around us abounds in available means to inflict death. Everyone has access to many cutting and piercing instruments or to solid, heavy objects that can be used to bludgeon a victim. From the Philadelphia police files such common household items as an electric iron, a floor lamp, and a pencil were uniquely listed as homicide weapons.

"Several students of homicide have tried to show that the high number of, or easy access to, firearms in this country is casually related to our relatively high homicide rate. Such a conclusion cannot be drawn from the Philadelphia data. Material subsequently reported in the present study regarding the place where homicide occurred, relationship between victim and offender, motives, and other variables, suggest that many situations, events, and personalities that converge in a

particular way and that result in homicide do not depend primarily upon the presence or absence of firearms. While it may be true both that the homicide rate is lower in Europe and that fewer homicides abroad involve use of firearms, it does not necessarily follow that the relatively high homicide rate in this country is merely due to greater accessibility of such weapons.

"Comparison of a general homicide rate with percentage use of firearms is not an adequate comparison. Unless all methods and weapons used in homicide are compared between two areas or communities, the proportionate use of firearms compared in isolation is not convincing evidence of a causal relation between a high homicide rate and the number of shootings. Moreover, comparison of like cultural areas having similar homicide rates but vastly dissimilar proportions of deaths caused by firearms would tend to reject an hypothesis of a causal nexus between the two phenomena. By way of example, Brearley noted for the years 1924-1926 that Pennsylvania had a homicide rate of 5.9 per 100,000 population. Using Philadelphia victim data to correspond to Brearley's use of mortality statistics, we see that the rate during 1948-1952 for criminal homicide deaths was 5.7, and for all homicides—criminal and non-criminal—the rate was 6.1. Despite the closeness of these Philadelphia rates with the Pennsylvania rate reported by Brearley, use of firearms in Pennsylvania amounted to 68 per cent of all methods, while use of firearms in Philadelphia was only 33 per cent. The fact that Brearley's figures are for an earlier period of time has no effect on the conclusion. Thus, while the homicide rates for these two population units are similar, the proportionate use of firearms is quite dissimilar, being over twice as high for the state as for the city. The hypothesis of a causal relationship between the homicide rate and proportionate use of firearms in killing is, therefore, rejected.

"More than the availability of a shooting weapon is involved in homicide. Pistols and revolvers are not difficult to purchase—legally or illegally—in Philadelphia. Police interrogation of defendants reveals that most frequently these weapons are bought from friends or acquaintances for such nominal sums as ten or twenty dollars. A penknife or butcher knife, of course, is much cheaper and more easily obtained. Ready access to knives and little reluctance to engage in physical combat without weapons, or 'to fight it out,' are as important as the availability of some sort of gun. The type of weapon used appears to be, in part, the culmination of assault intentions or events and is only superficially related to causality. To measure quantitatively the effect of the presence of firearms on the homicide rate would require knowing the number and type of homicides that would not have occurred had not the offender—or, in some cases, the victim—possessed a gun. Research would require determination of the number of shootings that would have been stabbings, beatings, or some

other method of inflicting death had no gun been available. It is the contention of this observer that few homicides due to shootings could be avoided merely if a firearm were not immediately present, and that the offender would select some other weapon to achieve the same destructive goal. Probably only in those cases where a felon kills a police officer, or vice versa, would homicide be avoided in the absence of a firearm."

Dr. Wolfgang also rejects the idea that homicide rates are higher in the United States than in England because of easier access to firearms.

A second very comprehensive study of criminal homicide, which has just been published, is one dealing with the 640 instances of this crime which occurred in the State of California during the year 1960. This study was done in the California Department of Justice, Bureau of Criminal Statistics. The author, Crime Studies Analyst Romey P. Narloch, reached much the same conclusions as did Dr. Wolfgang in regard to the relationship between the availability of firearms and the commission of criminal homicide (10):

"One of the clear conclusions of this research is that the mere availability of weapons lethal enough to produce a human mortality bear no major relationship to the frequency with which this act is completed. In the home, at work, at play, in almost any environmental setting a multitude of objects exist providing means for inflicting illegal death. Though the true number of times criminal homicide was attempted during 1960 cannot be known, and in spite of improved medical services, it is undoubtedly much more reasonable to conclude that the low yearly incidence of unlawful slayings is largely the product of human inhibitions to kill."

While there are apparently no statistical studies which have successfully linked firearms with criminal homicide in a casual relationship, the above mentioned studies are among numerous others which have placed the blame on various socio-economic problems of the day. Bensing and Schroeder, in their detailed study of homicide in the Greater Cleveland, Ohio, area during the years 1947-53, state (2):

"Homicide is not accidental. Nor is the fact that some areas have a high rate and others a low rate a matter of coincidence. The almost invariable association of a high homicide rate with so many other symptoms of social ill-health and economic need shows almost conclusively the socio-economic basis of homicide."

If these conclusions are indeed correct, then there would be little reason to expect firearms laws to reduce homicide rates. Aggravated assault (assault with intent to kill) would presumably be subject to the same factors as noted above.

Robberies and felony murders are usually committed by prior offenders. Law-enforcement officials seem to have little hope that firearms laws will keep guns out of the hands of such individuals. J. Edgar Hoover, Direc-

tor of the Federal Bureau of Investigation, has said (6):

"True, hoodlums and criminal gangs will obtain guns regardless of controls. During 1962, there were almost 700 felonious murders committed during the course of other crimes, such as burglary and robbery. This total also included gangland slayings and juvenile gang killings. Of this number, 52 percent were by gun. There were 39 juvenile gang killings, 19 of which were by gun. Of the 112 law enforcement officers who died from criminal action during the last 3 years, 108 were murdered with guns. Murders committed during the commission of other crimes will always be a problem. Usually, hardened criminals are involved. For these individuals, certain punishment is the only language they understand. Mandatory penalties, over and above the sentence for the substantive offense, for using a gun while committing a felony should be a certainty."

In writing about extremist organizations, Mr. Hoover said (3):

"But laws pertaining to owning and carrying firearms, which vary from state to state, bother few, if any, Klansmen, and weapons are illegally carried by them."

Lt. Col. Paul A. Rittelmann, acting commander of the Pennsylvania State Police, said in response to an interview question about the effectiveness of firearms legislation (22):

"The criminal will get hold of a gun, regardless of any law passed."

In testifying before a House District of Columbia legislative committee on the subject of proposed firearms legislation, Washington's Chief of Police, Robert V. Murray, had this to say (9):

"If I felt that we could take the guns out of the hands of the criminal with this bill or any other bill, I would be a hundred percent for it. But a criminal who is going to set out to hold up a place or assault somebody with a gun, the carrying of a gun is not going to deter him. He is a criminal anyhow, and he cannot lawfully possess a gun. So a law on the books that he cannot have a gun in his possession is not going to deter him.

"When an examination is made of the prior criminal histories of those involved, it is found that 76 percent had been arrested on some criminal charge prior to the time they became participants in the police murders and, of even more significance, over one-half of this group had been previously arrested for assaultive-type crimes such as rape, robbery, assault with a deadly weapon, assault with intent to kill, etc. In fact, the record discloses 9 individuals had been charged on some prior occasion with an offense of murder. Seven of these had been paroled on the murder charge, one was an escapee having fled confinement while serving time for murder, and one was an escapee who fled while waiting trial for murder. Sixty-eight percent of the 362 persons who were responsible are known to have had prior convictions on criminal charges and more than two-thirds of this group had received leniency in the form of probation or parole on at least one of these convictions. More than 1 of every 4 of the murderers was on parole or probation when he killed a police officer (17, pages 37, 38).

"It may be argued that any legislation that would reduce the number of pistols in circulation would substantially reduce the number of aggravated assaults. The argument rests upon two mistaken premises. First, it assumes that restrictive legislation will prevent criminals from obtaining guns. The fact is that experience has shown that legislation such as the Sullivan Law (New York state—ed.) does not reduce the number of pistols in the hands of criminals. Second, the argument assumes that handguns are used in most aggravated assaults, whereas the fact is that pistols are used in only a small percentage of assaults.

"Legislation imposing further restrictions on the ownership and possession of handguns is not the answer to our law-enforcement problem. Attention should be focused on the criminal, not the gun."

Compounding the problem in robberies and felony murders is the large number of firearms which are stolen annually, many by individuals who will later misuse them in some criminal act. The fact that criminals do steal firearms for use in crimes naturally reduces the anticipated effectiveness of existing firearms control laws.

While the F.B.I. has not made a practice of collecting data on stolen firearms (5), information on some 20,000 stolen or missing guns is contained in the FBI's new National Crime Information Center (15).

Senator Hugh Scott of Pennsylvania recently secured data from the U.S. Department of Defense regarding the number of firearms stolen from the U.S. Army, Navy, Marine Corps, and Air Force, for each of the years 1954 through 1964 (16). In this eleven-year period, some 15,848 guns were stolen, an average of 1,440 per year (7, pages 10-12). In making this request in connection with proposed federal firearms legislation, Senator Scott said (13):

"Certainly, there are no more stringent regulations covering the control of firearms than those put into effect by the military, and for this reason, I thought this information would be particularly helpful."

In Washington, D.C., police reported that "hot" guns (those sold illegally) were involved in nearly all the 223 shootings and 18 gun murders recorded in that city during the year ending June 30, 1957 (14). "Hot" guns were used, too, in probably 20 percent of the year's 937 robberies, according to Deputy Police Chief Edgar E. Scott, chief of detectives. Suspects in crimes involving a gun most commonly explain that they "found it" or "bought it from a friend." Detectives who know the illicit market say the price of a pistol may vary from \$5 for a model whose ability to fire is questionable to \$35 or \$40 for a "sleek" specimen (8). These prices are, of course, much less than the cost of a new handgun purchased from a firearms dealer.

In New York City, where the most restrictive firearms laws in the nation are in effect (it is necessary to have a police permit to possess a handgun even in one's own home), police reported that in 1966, not a single

NYC homicide involved a licensed firearm (11). Since 1944, New York City police have taken possession of 28,409 illegally-possessed pistols (12).

The Los Angeles County District Attorney's Office conducted a statistical survey designed to provide information on where people involved in crimes obtain their weapons (21). This 1966 survey covered the investigation of 4,045 criminal complaints, 263 of which involved possession of a firearm by involved parties.

A total of 222 guns were recovered by the police. The remainder, according to the police, were destroyed by the suspects, sold or given to other persons, or in many instances the suspect denied ever possessing a gun. Of the firearms recovered, 39 were stolen, 39 were obtained from private parties, and five were found. In 102 cases, police could not determine the source of the gun. In only 37 instances were the recovered firearms purchased from a local retailer.

All of these data indicate that firearms laws seem to have little effect in preventing the illegal acquisition of firearms for use in illegal activities.

CONCLUSION

This study tested the statistical hypothesis *States with firearms licensing laws have lower crime rates than states not having such laws*. Statistical analysis of the latest F.B.I. crime data resulted in this hypothesis being rejected. The conclusion was reached that there is no statistically-significant difference in crime rates between states that have firearms licensing laws and those that do not.

An attempt was made to explain the results of the statistical analysis by reviewing the studies which have so far been made in this field.

- Some of the theses advanced were:
1. Crime is caused by socio-economic problems, not by firearms. (2, 17, page vii).
 2. Firearms are involved in only 3% of all crimes in the United States. Therefore, firearms licensing laws, even if highly effective, would not be likely to cause any appreciable decrease in the overall crime rate (3, 7).
 3. Firearms laws have varying degrees of effectiveness. The degree of effectiveness determines the effect on the crime rate. Therefore, enactment of firearms laws is not automatically reflected in a reduction of crime rates (7).
 4. The incidence of non-felony homicide is not related to the availability of firearms; when human inhibitions to kill are overcome, whatever weapon is readily available will be used (10, 20). The easy availability of firearms does not make murder easy (7).
 5. In the case of robbery and felony murder, experience of law-enforcement officials has shown that criminals are not deterred in their quest for firearms by firearms laws, and such individuals persist in carrying weapons regardless of any law which has so far been enacted (3, 6, 8, 9, 11, 12, 14, 21 and 22).

CONGRESSIONAL RECORD

6. Many firearms are stolen and available to the criminal through illicit channels (8, 13, 14, 15, 16, 20, 21 and 22). This limits the effectiveness of any law which regulates the acquisition of firearms through legitimate channels.

7. Criminals will substitute other weapons in the commission of crimes when firearms are not available. Legislation which prevents criminals from purchasing firearms is altogether irrelevant to the crime problem unless it can be shown that the end result was an actual reduction in crime, not just a reduction in the number of firearms possessed by the criminal element (7).

BIBLIOGRAPHY

- (1) Alder, H. L., and E. B. Roessler. 1964. Introduction to probability and statistics. Page 125. W. H. Freeman and Company, San Francisco and London. 313 pp.
- (2) Bensing, R. C., and O. Schroeder. 1960. Homicide in an urban community. Page 184. Charles C. Thomas, Springfield, Ill. 193 pp.
- (3) Hoover, J. E. 1966. The resurgent Klan. Page 618. Amer. Bar Ass. J. 52: 617-620.
- (4) ———. 1966. Personal communication to Hon. Roman L. Hruska, a United States Senator from the State of Nebraska. Director, Federal Bureau of Investigation, U.S. Department of Justice, Washington, D.C. July 29.
- (5) ———. 1965. Personal communication. May 27.
- (6) ———. 1963. Newsletter to all law enforcement officials. June 1.

272-024-9110

(7) Krug, A. S. 1966. The misuse of firearms in crime. Paper presented at the 1966 Statewide Inservice Training Conference of The Pennsylvania Game Commission, The Pennsylvania State University, University Park, June 29. 14 pp. mimeo.

(8) Landauer, J. 1958. Illegal guns used in many shootings here. Page B-1. The Washington Post. Aug. 4.

(9) Murray, R. V. 1963. Statement on H.R. 5608. In Hearings Before the House Committee on the District of Columbia, U.S. House of Representatives, Eighty-sixth Congress, Second Session, on H.R. 5608. U.S. Government Printing Office, Washington, D.C.

(10) Narloch, R. P. 1967. Criminal homicide in California. Page 55. California Department of Justice, Bureau of Criminal Statistics, Sacramento. 88 pp.

(11) Nevard, J. 1967. Personal communication to Neal Knox, editor, Gun Week. Deputy Commissioner, Press Relations, New York City Police Department. April 4.

(12) North, G. W. 1967. Selected statistics from annual reports of the New York City Police Department. Chairman, Committee on Firearms Legislation, Sportsmen's Council, Marine District of New York State, Inc.

(13) Scott, H. 1965. Firearms report. Congressional Record—Appendix. Oct. 21. Proceedings and Debates of the Eighty-ninth Congress, First Session. U.S. Government Printing Office, Washington, D.C.

(14) Shaffer, H. B. 1959. Firearms control. Page 848. Editorial Research Reports 2:833-851.

(15) Thomas, B. (Ed.). 1967. Communications circuitry, teleprinters, and related control equipment. Crime Control Digest 1(8):4.

(16) U.S. Department of Defense (Paul H. Riley, Deputy Assistant Secretary). 1965. Firearms lost as a result of robberies, burglaries, and other thefts at U.S. military active and reserve installations during the period 1954 through 1964. U.S. Department of Defense, Washington, D.C. Aug. 3.

(17) U.S. Department of Justice, Federal Bureau of Investigation. 1966. Uniform crime reports—1965. U.S. Government Printing Office, Washington, D.C. 192 pp.

(18) U.S. Department of Treasury, Internal Revenue Service. 1964. National Firearms Act and Federal Firearms Act. Pub. No. 364. U.S. Government Printing Office, Washington, D.C. 13 pp.

(19) Wisconsin Legislative Reference Library. 1960. The regulation of the firearms by the states. Research bull. 130. Wisconsin Legislative Reference Library, Madison. 34 pp.

(20) Wolfgang, M. E. 1958. Patterns in criminal homicide. Pages 79-83, 322. Oxford University Press, London, Bombay, and Karachi. 413 pp.

(21) Younger, E. V. 1967. Los Angeles County district attorney's gun survey. Office of the District Attorney, County of Los Angeles, Los Angeles. 5 pp.

(22) Zdinak, P. 1966. State police head nearly became theatre manager. Page 8. The Centre Daily Times, State College and Bellefonte, Pa. Aug. 25.

Editor's Note: The present study was deliberately constructed to be consistent with the Wisconsin Legislative Reference Library study on "the regulation of the firearms by the states." Methodologically, it is the natural and proper sequence to the Wisconsin study, updating and analyzing the data by correct statistical treatment. The criteria used in the Wisconsin study for classifying each state as licensing or non-licensing were followed as closely as possible. Because of this similarity in methodology between the two studies, the results can be compared directly.

The study by Mr. Krug was designed specifically to test the hypothesis "States with firearms licensing laws have lower crime rates than states not having such laws." There was no intent, stated or otherwise, to expand the analysis of data beyond the testing of this hypothesis.

August 1, 1967



Congressional Record

PROCEEDINGS AND DEBATES OF THE 90th CONGRESS, SECOND SESSION

Vol. 114

WASHINGTON, TUESDAY, JANUARY 30, 1968

No. 12

STUDY PROVES THERE IS NO CAUSAL RELATIONSHIP BETWEEN GUN OWNERSHIP AND CRIME

Mr. CASEY. Mr. Speaker, I would like to bring to the attention of my colleagues in the House a recent statistical study which should clear away much of the confusion and contradiction which has been so prevalent in the long debate over firearms legislation.

For some time, I have been trying to convey the idea to this body that the best way to check and turn back the rising tide of crime in our Nation might very well be to crack down on the criminal. I have carried this simple logic a step further in weighing the merits of firearms legislation. I think it makes sense to direct this kind of legislation at the hand that wields the weapon, rather than at the weapon itself.

Still there are those who persist in trying to lay the blame for our national crime problem at the foot of our great American heritage of reasonable ownership of firearms. They do so without any basis in fact.

Now at last, we have a comprehensive statistical study which examines this contention. It tests the hypothesis, "There is a causal relationship between the availability of firearms and crime rates." And it totally rejects the idea.

The study concluded:

There is no positive correlation between the extent of firearms ownership and crime rates. Rather, there is a negative correlation.

In general, as the proportion of the population possessing firearms goes down, crime rates go up—

It stated further:

Fewer people with guns do not mean less crime.

I believe this study carries an important message which should be carefully considered in weighing future proposals on the regulation of firearms.

The study follows:

THE RELATIONSHIP BETWEEN FIREARMS OWNERSHIP AND CRIME RATES: A STATISTICAL ANALYSIS

By
ALAN S. KRUG
January 29, 1968

INTRODUCTION

It is estimated that there are some 200 million firearms in this nation, owned by 40 or 50 million Americans (8). There is at least one firearm in more than half the homes in the U.S. (5), and last year more than 20 million Americans took part in the various shooting sports (7).

Claims that this widespread availability of firearms is a contributing cause to rapidly-rising crime in the nation have been widely circulated by proponents of "anti-gun" legislation.

Yet there is no reliable evidence to support such a contention. To date, not a single scientific study has shown a causal relationship between firearms and crime.

This alleged relationship has even been written into proposed federal legislation. The current version of the Dodd Bill, Amendment 90, contains the following state-

ments as part of its preamble (3):

The Congress hereby finds and declares—

That the ease with which any person can acquire firearms . . . is a significant factor in the prevalence of lawlessness and violent crime in the United States;

That there is a causal relationship between the easy availability of firearms and juvenile and youthful criminal behavior, . . .

This study shows that there is no statistical support for these claims. The statistics even demonstrate the opposite—that crime rates tend to be lower where the percentage of gun ownership is higher. These findings confirm other scientific studies which have concluded that firearms are not a cause of crime, but merely one of many incidental factors (9, 13).¹

¹ See Appendix A.

FIREARMS OWNERSHIP AND CRIME RATES

If the availability of firearms were indeed a cause of crime, crime rates should rise and fall fairly consistently with rates of firearms ownership. States where a high proportion of the population possesses firearms would be expected to have higher crime rates than states where a lesser proportion of the population owned firearms. This proposition can be examined in the light of basic statistics available to all.

Because the major use of firearms is for hunting, the number of individuals who purchase hunting licenses in each state is a reliable guide to the extent of firearms ownership in those same states. Appendix Table 1 shows the rate of hunting license holders per 100,000 of population and rates of serious crime,² murder, aggravated assault, and robbery for each of the fifty states in 1966. The first can be taken as a reasonable index of firearms ownership, and as such can be used in a statistical analysis³ to determine the correlation, if any, between the extent of firearms ownership and crime rates. It does in fact constitute the best index available at the present time. In this way, it is possible to test the hypothesis "there is a causal relationship between the availability of firearms and crime rates."⁴

Figure 1 is a graph⁵ of the index of firearms ownership and serious crime data. The line of the graph represents the overall relationship of the various points on the graph, and was fit by the "method of least squares."⁶ This "line of best fit," which slopes downward, shows a negative correlation between the index of firearms ownership and serious crime rate, by state. This means that, in general, states with a high propor-

² Serious crime as defined by the FBI in the Uniform Crime Reports is (1) murder and non-negligent manslaughter; (2) forcible rape; (3) robbery; (4) aggravated assault; (5) burglary; (6) larceny (\$50 and over); and (7) auto theft (11, page 4). Murder and non-negligent manslaughter, aggravated assault and robbery are the three specific crime categories in which firearms are sometimes misused.

³ Specifically, a regression analysis, which will (1) show if there is a relationship between the index of firearms ownership and crime rates and (2) enable any existing relationship to be expressed by means of an equation.

⁴ Use of the rate of hunting license holders as an index of firearms ownership is consistent with the 1959 Gallup poll (4) and the 1967 Harris poll (5) on firearms, which proposed to measure the extent of firearms ownership on a regional basis. The Gallup and Harris polls cannot be used for the construction of a state firearms ownership index as the polls are unable to supply data on individual states because their samples are not large enough (10).

tion of population possessing firearms have lower serious crime rates than states with a lower proportion of the population possessing firearms.

Figures 2, 3, and 4 are graphs with "lines of best fit" for the index of firearms ownership and murder and non-negligent manslaughter, aggravated assault, and robbery, respectively. In all three cases, the line of best fit slopes downward, showing that there is a negative correlation between the index of firearms ownership and the various crime rates.

These findings appear to refute the claim by the supporters of anti-firearms legislation that the availability of firearms is a major contributing factor to a high level of crime rates. Beyond that they lend strength to the argument that widespread ownership of firearms may actually lessen crime. Opponents of unduly restrictive firearms legislation often contend that criminals are reluctant to attempt to attack or rob persons whom they have reasonable cause to believe might be armed with a firearm.⁷

In examining the connection between any two sets of variables, it should be pointed out that the presence of a correlation between the two does not necessarily mean that one causes the other. The relationship may be coincidental; one variable may be a cause, but not the sole cause, of the other; the two variables may be interdependent; or the two variables may be affected by the same cause. Therefore, the negative correlation between firearms ownership and crime rates supports, but does not necessarily prove, the theory that the greater the extent of firearms ownership, the lower the crime rates will be. But it does show that the idea of a causal relationship between the availability of firearms and crime rates is fancy and not fact. The hypothesis must be rejected.

The results of the statistical analysis are explained further in Appendix Table 2.

CONCLUSION

Firearms are readily available in America, with some 200 million guns owned by 40 to 50 million individuals.⁸

This study tested the hypothesis, "There is a causal relationship between the availability of firearms and crime rates." The extent of firearms ownership was compared with rates of serious crime, murder, aggra-

⁵ Statistically, this graph is a scatter diagram, which is a graphical representation of a set of n pairs of values of X and Y in a coordinate system. In this case, the X values are the index of firearms ownership and the Y values are the serious crime rates.

⁶ For a simplified explanation of the "method of least squares," used for finding the "line of best fit" to a scatter diagram of n points, see *Introduction to Probability and Statistics* (1) or *Elementary Statistics* (2). The equation of the line takes the form $Y_e = a + bX$, where a is the Y intercept and b is the slope of the line.

Figure 1. Correlation of total serious crime rates with index of firearms ownership by state: 1966.

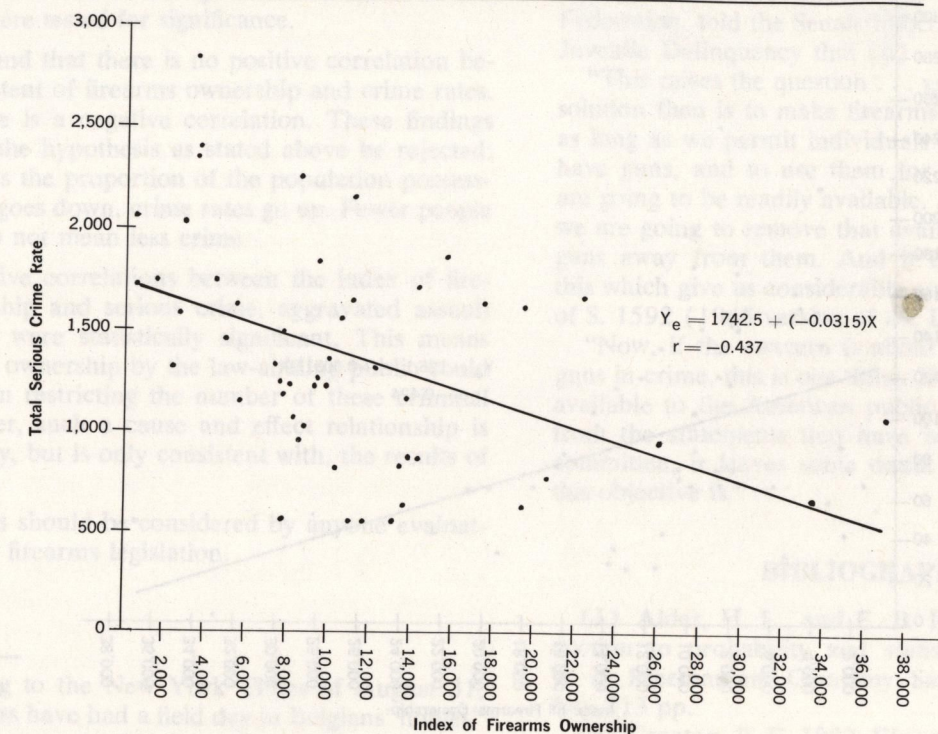


Figure 2. Correlation of murder and non-negligent manslaughter rates with index of firearms ownership by state: 1966.

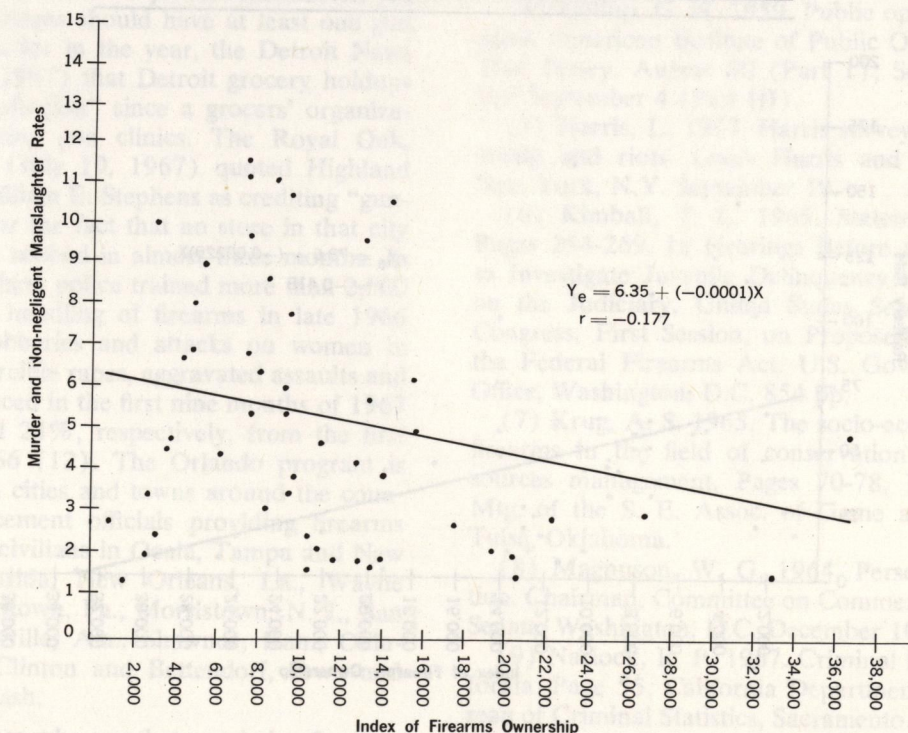


Figure 3. Correlation of aggravated assault rates with index of firearms ownerships by state: 1966.

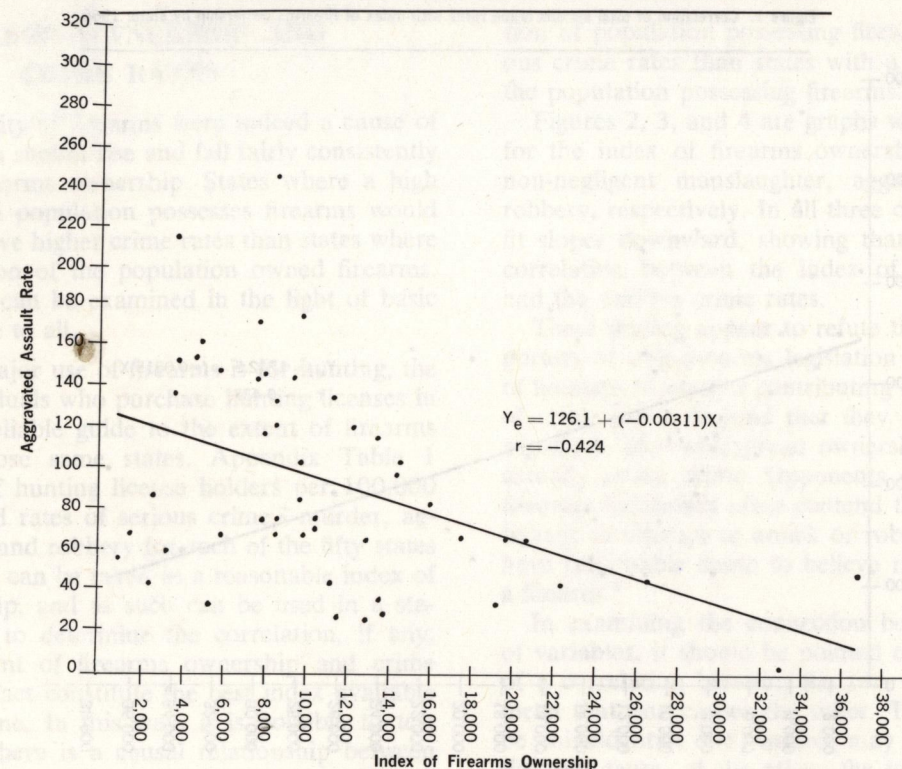
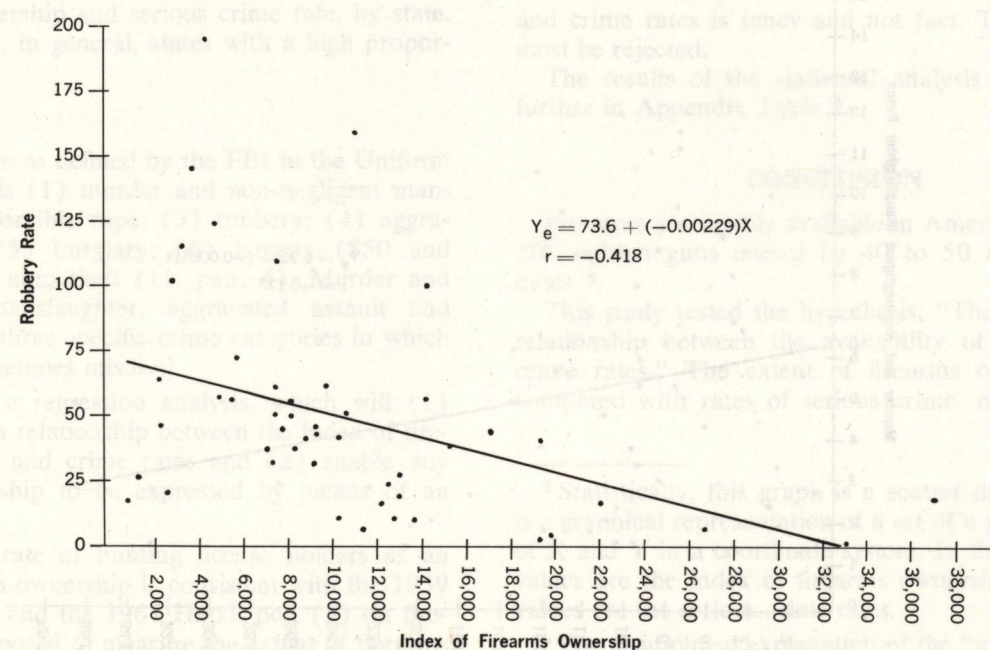


Figure 4. Correlation of robbery rates with index of firearms ownership by state: 1966.



vated assault, and robbery in each of the fifty states. The comparison was made by statistical methods and the results were tested for significance.

It was found that there is no positive correlation between the extent of firearms ownership and crime rates. Rather, there is a negative correlation. These findings dictate that the hypothesis as stated above be rejected. In general, as the proportion of the population possessing firearms goes down, crime rates go up. Fewer people with guns do not mean less crime.

The negative correlations between the index of firearms ownership and serious crime, aggravated assault and robbery were statistically significant. This means that firearms ownership by the law-abiding public could be a factor in restricting the number of these criminal acts. However, such a cause and effect relationship is not proven by, but is only consistent with, the results of this study.

These facts should be considered by anyone evaluating proposed firearms legislation.

⁷ According to the New York Times of August 31, 1967, "robbers have had a field day in Belgians' homes" in the Congo since the Belgians' firearms were ordered confiscated by General Mobutu, the Congolese president. On December 28, 1967, the Times reported that the Davidson County grand jury at Nashville, Tennessee, had recommended that citizens arm against an outbreak of crime in that area. To protect themselves, the grand jury said, "citizens should have at least one gun in every home." Earlier in the year, the Detroit News reported (July 20, 1967) that Detroit grocery holdups showed "a sharp reduction" since a grocers' organization began conducting gun clinics. The Royal Oak, Michigan, Tribune (July 19, 1967) quoted Highland Park police chief William E. Stephens as crediting "gun-toting merchants" for the fact that no store in that city of 38,000 had been robbed in almost three months. In Orlando, Florida, where police trained more than 2,500 women in the safe handling of firearms in late 1966 after a series of robberies and attacks on women in their own houses, forcible rapes, aggravated assaults and burglaries were reduced in the first nine months of 1967 by 90%, 25%, and 24%, respectively, from the first nine months of 1966 (12). The Orlando program is now being copied in cities and towns around the country, with law-enforcement officials providing firearms training courses for civilians in Ocala, Tampa and New Smyrna Beach, Florida, New Orleans, La., Wayne County, N. C., Allentown, Pa., Morristown, N. J., San Diego, Calif., Huntsville, Ala., Shawnee, Kan., Oklahoma City, Okla., Clinton and Bettendorf, Iowa and suburban Seattle, Wash.

⁸ The intent of those who say that restrictive firearms legislation should be enacted because of the availability of firearms has been questioned in testimony before

congressional committees. The Honorable Thomas L. Kimball, executive director of the National Wildlife Federation, told the Senate Subcommittee to Investigate Juvenile Delinquency that (6):

"This raises the question . . . as to whether or not the solution then is to make firearms not available because as long as we permit individuals in this country . . . to have guns, and to use them for lawful purposes, they are going to be readily available. And the only way that we are going to remove that availability is to take their guns away from them. And it is expressions such as this which give us considerable concern about the intent of S. 1592 (1965 version of the Dodd bill-ed.)."

"Now, if the concern is about crime and the use of guns in crime, this is one thing. If it is to make guns unavailable to the American public, this is another. And from the statements that have been made before this committee, it leaves some doubt . . . as to just what this objective is."

BIBLIOGRAPHY

- (1) Alder, H. L., and E. B. Roessler. 1964. Introduction to probability and statistics. Pages 160-167. W. H. Freeman and Company, San Francisco and London. 313 pp.
- (2) Croxton, F. E. 1953. Elementary statistics. Pages 114-126. Dover Publications, Inc., New York, N.Y. 376 pp.
- (3) Dodd, T. J., J. S. Clark and G. M. Smathers. 1967. Amendment No. 90 to S. 1. Pages 2, 3. United States Senate, Ninetieth Congress, First Session. 28 pp.
- (4) Gallup, G. H. 1959. Public opinion poll on firearms. American Institute of Public Opinion, Princeton, New Jersey. August 30 (Part I); September 2 (Part II); September 4 (Part III).
- (5) Harris, L. 1967. Harris survey covers gun ownership and riots. Louis Harris and Associates, Inc., New York, N.Y. September 19.
- (6) Kimball, T. L. 1965. Statement on S. 1592. Pages 254-269. In Hearings Before the Subcommittee to Investigate Juvenile Delinquency of the Committee on the Judiciary, United States Senate, Eighty-ninth Congress, First Session, on Proposed Amendments to the Federal Firearms Act. U.S. Government Printing Office, Washington, D.C. 854 pp.
- (7) Krug, A. S. 1965. The socio-economic impact of firearms in the field of conservation and natural resources management. Pages 70-78. Proc. 19th Ann. Mtg. of the S. E. Assoc. of Game and Fish Comm., Tulsa, Oklahoma.
- (8) Magnuson, W. G. 1964. Personal communication. Chairman, Committee on Commerce, United States Senate, Washington, D.C. December 10.
- (9) Narlock, R. P. 1967. Criminal homicide in California. Page 55. California Department of Justice, Bureau of Criminal Statistics, Sacramento. 88 pp.
- (10) Shapiro, C. 1967. Personal communication. Associate, Louis Harris and Associates, Inc., New York, N.Y. October 18.

(11) U.S. Department of Justice, Federal Bureau of Investigation. 1967. Uniform crime reports—1966. U.S. Government Printing Office, Washington, D.C. 185 pp.

(12) U.S. Department of Justice, Federal Bureau of Investigation. 1967. Uniform crime reporting (January-September 1967). Page 2. Federal Bureau of Investigation, U.S. Department of Justice, Washington, D.C. 4 pp.

(13) Wolfgang, M. E. 1958. Patterns in criminal homicide. Pages 79-83. Oxford University Press, London, Bombay, and Karachi. 413 pp.

The author: Alan S. Krug has been conducting research on the socio-economics of firearms since 1958. Formerly an economist on the staff of The Pennsylvania State University, he is the author of more than 20 published technical and semi-technical papers in the fields of natural resources management, economics, and firearms legislation. He is presently assistant to the director of the National Shooting Sports Foundation, Inc.

APPENDIX A

Perhaps the most detailed study of homicide accomplished to date is that of Professor Marvin E. Wolfgang, Graduate Chairman of the Department of Sociology at the University of Pennsylvania. Dr. Wolfgang's study dealt with the 588 criminal homicides which occurred in the city of Philadelphia, Pennsylvania, between January 1, 1948, and December 31, 1952.

One segment of the work dealt with the weapons used in criminal homicide. The results of this study led Dr. Wolfgang to conclude (13):

"It is probably safe to contend that many homicides occur only because there is sufficient motivation or provocation, and that the type of method used to kill is merely an accident of availability; that a gun is used because it is in the offender's possession at the time of incitement, but that if it were not present, he would use a knife to stab, or fists to beat his victim to death"

"Several students of homicide have tried to show that the high number of, or easy access to, firearms in this country is causally related to our relatively high homicide rate. Such a conclusion cannot be drawn from the Philadelphia data. Material subsequently reported in the present study regarding the place where homicide occurred, relationship between victim and offender, motives, and other variables, suggest that many situations, events, and personalities that converge in a particular way and that result in homicide do not depend primarily upon the presence or absence of firearms. . . ."

"More than the availability of a shooting weapon is involved in homicide. . . . The type of weapon used appears to be, in part, the culmination of assault intentions or events and is only superficially related to causality. . . . It is the contention of this observer that few homicides due to shooting could be avoided merely if a firearm were not immediately present, and that the offender would select some other weapon to achieve the same destructive goal. . . ."

Another very comprehensive study of criminal homicide, which has just been published, deals with the 640 murders which occurred in the State of California in 1960. This study was done in the California Department of Justice, Bureau of Criminal Statistics. The author, Crime Studies Analyst Romey P. Narloch, reached much the same conclusions as did Dr. Wolfgang in regard to the relationship between the availability of firearms and the commission of criminal homicide (9):

"One of the clear conclusions of this research is that the mere availability of weapons lethal enough to produce a human mortality bear no major relationship to the frequency with which this act is completed. In the home, at work, at play, in almost any environmental setting a multitude of objects exist providing means for inflicting illegal death. Though the true number of times criminal homicide was attempted during 1960 cannot be known, and in spite of improved medical services, it is undoubtedly much more reasonable to conclude that the low yearly incidence of unlawful slayings is largely the product of human inhibitions to kill."

APPENDIX TABLE 1.—INDEX OF FIREARMS OWNERSHIP AND CRIME RATES FOR EACH OF THE 50 STATES, 1966

State	Index of firearms ownership—Rate of hunting license holders ¹	Crime rates ²				State	Index of firearms ownership—Rate of hunting license holders ¹	Crime rates ²			
		Serious crime	Murder	Aggravated assault	Robbery			Serious crime	Murder	Aggravated assault	Robbery
Alabama	9,924	1,208.9	10.9	177.7	32.0	Montana	22,127	1,194.6	2.8	42.6	17.8
Alaska	15,719	1,866.6	12.9	82.0	36.0	Nebraska	13,680	887.4	1.8	31.3	24.9
Arizona	8,232	2,215.7	6.1	122.4	55.5	Nevada	14,183	2,360.2	10.6	98.5	96.9
Arkansas	13,224	831.4	7.1	116.6	29.4	New Hampshire	12,974	680.5	1.9	21.4	10.3
California	3,704	2,825.7	4.6	159.1	118.0	New Jersey	2,396	1,599.7	3.5	85.4	63.7
Colorado	14,152	1,718.4	4.0	93.8	53.8	New Mexico	9,388	1,847.6	6.1	145.9	43.8
Connecticut	2,200	1,306.1	2.0	45.8	20.9	New York	3,854	2,399.6	4.8	155.2	142.5
Delaware	5,074	1,485.8	8.2	33.8	56.6	North Carolina	8,347	1,086.9	8.7	248.2	22.8
Florida	3,520	2,280.0	10.3	213.0	99.9	Ohio	11,774	560.5	1.8	23.2	6.2
Georgia	7,344	1,309.0	11.3	142.6	34.9	Oklahoma	5,802	1,170.8	4.5	67.8	70.0
Hawaii	961	2,077.1	2.9	53.9	21.6	Oregon	9,591	1,282.9	5.5	81.2	40.6
Idaho	26,408	959.6	3.0	46.1	7.8	Pennsylvania	17,461	1,624.2	2.7	65.2	45.8
Illinois	4,282	1,729.7	6.9	156.4	184.9	Rhode Island	8,248	964.8	3.2	62.7	25.4
Indiana	9,966	1,357.6	4.0	66.0	61.2	South Carolina	1,576	1,732.3	1.4	62.7	25.4
Iowa	10,284	814.0	1.6	25.0	12.8	South Dakota	7,747	1,210.4	11.6	172.0	28.7
Kansas	8,597	1,062.6	3.5	69.9	29.6	Tennessee	20,498	775.6	1.5	62.9	10.0
Kentucky	7,831	1,199.5	7.0	73.5	42.8	Texas	9,442	1,275.6	7.8	105.2	34.4
Louisiana	7,792	1,485.1	9.9	147.9	66.8	Utah	5,587	1,607.3	9.1	149.2	54.7
Maine	19,161	659.7	2.2	33.0	5.9	Vermont	19,528	1,652.3	2.0	65.2	36.5
Maryland	4,927	2,062.3	7.0	164.9	123.7	Virginia	33,232	695.6	1.5	7.4	4.0
Massachusetts	2,509	1,654.2	2.4	60.5	46.0	Washington	8,100	1,249.2	6.5	132.9	42.9
Michigan	11,070	2,174.0	4.7	136.3	156.0	West Virginia	10,550	1,579.2	2.5	72.4	36.7
Minnesota	11,009	1,317.4	2.2	44.4	49.4	Wisconsin	12,969	591.1	4.2	61.5	19.1
Mississippi	12,005	587.1	9.7	119.6	13.3	Wyoming	13,841	891.5	1.9	29.2	12.9
Missouri	7,899	1,680.2	5.4	118.5	105.8		36,991	1,080.0	4.9	45.0	21.0

¹ Number of hunting license holders per 100,000 of population.
² Number of offenses per 100,000 of population.

Source: Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior (hunting license data); Federal Bureau of Investigation, U.S. Department of Justice (crime rates) (11, pp. 66-67).

APPENDIX TABLE 2.—SUMMARY OF RESULTS: STATISTICAL ANALYSIS OF THE CORRELATION BETWEEN THE INDEX OF FIREARMS OWNERSHIP AND CRIME RATES, 1966

Correlation of index of firearms ownership with—	Equation of line of best fit ¹	Correlation coefficient ²	t-value	Is negative correlation significant? ³	Level of significance (percent)
Total serious crime	$Y_e = 1,742.5 - 0.0315X$	-0.437	3.36	Yes	1
Murder and nonnegligent manslaughter	$Y_e = 6.35 - 0.0001X$	-.117	.76	No	5
Aggravated assault	$Y_e = 126.1 - 0.00311X$	-.424	3.26	Yes	1
Robbery	$Y_e = 73.6 - 0.00229X$	-.418	3.19	Yes	1

¹ The equations of the lines of best fit take the form $Y_e = a + bX$, where X is the index of firearms ownership, Y is the estimated value of crime rate obtained from the line of best fit for the corresponding value of X , a is the Y intercept, and b is the slope of the line of best fit.

² Correlation coefficients, r , indicate the extent of the linear relationship between each set of variables. Testing of the significance of the correlation coefficients was accomplished by applying a "t-test," where

$$t = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

n being the size of the sample from which the data were obtained. The term " $n-2$ " constitutes the number of degrees of freedom. The number of degrees of freedom is "the maximum number of variates which can freely be assigned (i.e. calculated or assumed) before the rest of the variates are completely determined: that is, it is the total number of variates minus the number of independent relationships existing among them."

For $n-2$, or 48 degrees of freedom, $t_{.01} = 2.686$, any value in excess of this being significant at the 1 percent level. This means that if a t -value in excess of 2.686 is calculated, there is no more than a 1-in-100 chance that the correlation is not significant. In such a case, it is a commonly accepted convention in statistics to consider the result highly significant.

³ The correlation coefficients showing the extent of the linear relationship between the index of firearms ownership and (1) total serious crime, (2) aggravated assault, and (3) robbery are remarkably close in value. In all 3 cases, the negative correlation is highly significant, being so at the 1 percent level of significance.

Correlation of the index of firearms ownership with murder and nonnegligent manslaughter is not significant at either the 1-percent or the 5-percent level. In the case where a result is significant at the 5-percent level, there is no more than 1 chance in 20 that the result is in error. Results are ordinarily not considered significant when the probability of error is in excess of 5 percent.

Single copies of this publication are available at 25¢ each.
For special quantity prices, write:

NATIONAL SHOOTING SPORTS FOUNDATION, INC.

1075 POST ROAD
RIVERSIDE, CONNECTICUT 06878