ATTACHMENT A

EXHIBIT A

Document Title: **Effectiveness of Denial of Handgun Purchase by Violent Misdemeanants, Final Report**

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Document No.: **197063**

Date Received: **October 24, 2002**

Award Number: **98-IJ-CX-0024**

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Final Report
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Violence Prevention Research Program
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FINAL REPORT

Approved By: [signature]

Date: 8/4/02

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ACKNOWLEDGMENTS

The investigators are grateful to California Attorney General Bill Lockyer, Firearms Branch Chief Randy Rossi, and many others at the California Department of Justice for their support and technical assistance. Lois Mock, our program officer at the National Institute of Justice, was unstinting in her expert guidance and encouragement. Our peer reviewers offered many helpful comments. We take particular pleasure in acknowledging the efforts of our staff: Barbara Claire, Program Administrator, Violence Prevention Research Program; Melissa Garcia, Kevin Grassel, Vanessa McHenry, and Michael Romero, MPH.

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ABSTRACT

Background: Federal and state laws prohibit the purchase of firearms by felons and certain others. Some states additionally prohibit the purchase of handguns by persons convicted of selected misdemeanor crimes, but most do not. California has denied handgun purchases by violent misdemeanants since 1991; the prohibition remains in effect for ten years following the conviction. Such policies enjoy widespread public support, but their effectiveness is unknown.

Description of Current Study: The present study is an evaluation of California's prohibition on the purchase of firearms by violent misdemeanants. The study uses a retrospective cohort design. We sought first to determine the risk factors for new criminal activity among violent misdemeanants who seek to purchase handguns. We then determined whether the denial of handgun purchase by violent misdemeanants affected their risk of arrest for new crimes, particularly gun and/or violent crimes.

The study population consisted of all persons 21-34 years of age who sought to purchase a handgun from a federally licensed firearm dealer in California during 1989-1991 and who had at least one conviction, in the preceding ten years, for a violent misdemeanor that became grounds for denial of handgun purchase in 1991. After exclusions, study cohorts consisted of 986 persons whose purchase applications were made in 1991 and were denied ("denied persons") and 787 persons whose purchase applications were made in 1989-1990, before the new law took effect, and were approved ("purchasers").

The main outcome measures were the incidence and relative risk of first arrest for new gun and/or violent crimes and non-gun, nonviolent crimes over three years after actual or attempted handgun purchase. The Kaplan-Meier product limit method and Cox proportional hazards regression were used to assess difference in risk between the two study cohorts.

Results: Over three years following their actual or attempted handgun purchases, 546 (33.0%) of 1,654 subjects with follow-up were arrested for a new crime, including 296 (31.9%) of 927 denied persons and 250 (34.4%) of 727 purchasers. After adjusting for differences in age, sex, and prior criminal history characteristics, purchasers were more likely than denied persons to be arrested for new gun and/or violent crimes (Relative Hazard (RH), 1.29; 95% Confidence Interval (CI), 1.04-1.60), but not for non-gun, non-violent crimes (RH, 0.96; 95% CI, 0.78-1.19). In both groups, risk of arrest was also strongly related to age and number of convictions accrued prior to actual or attempted handgun purchase.

Conclusions: Denial of handgun purchase to violent misdemeanants is associated with a specific decrease in risk of arrest for new gun and/or violent crimes.

INTRODUCTION

Although decreasing, rates of firearm violence remain high. In 2000, an estimated 544,000 firearm-related violent crimes were committed in the United States, including approximately 10,180 firearm homicides (FBI 2001; Rennison 2001). One widely accepted policy to prevent such violence is to prohibit the purchase and possession of firearms by persons believed to be at high risk for future criminal activity. The Gun Control Act of 1968 outlaws the purchase and possession of firearms by convicted felons, fugitives from justice, narcotics addicts, and certain others. More recent federal initiatives have extended these denial criteria to include persons convicted of misdemeanor domestic violence offenses and those subject to domestic violence restraining orders. By 2000, California and 17 other states had extended their criteria for denial of firearm purchase to include convictions for a number of violent misdemeanors and other offenses (RJIS 2001). Since the enactment of the Brady Handgun Violence Prevention Act in 1993, prospective handgun purchasers throughout the United States have been subject to a mandatory waiting period and background check. Many states had implemented such requirements earlier. This federal requirement for a criminal records background check of prospective handgun purchasers has been one of the major federal crime prevention initiatives of the past decade. It remains controversial and has been challenged in court. Criminal and mental health record background checks of prospective handgun purchasers now identify 150,000-200,000 prohibited persons per year, 42% of whom are not convicted felons (Bowling, Lauver et al. 2001).

One scholar of the subject has noted that "an effective transfer-regulating scheme that prevents guns from going to dangerous people would be nearly as successful as a much more intrusive scheme targeted at current gun owners" (Cook, Molliconi et al. 1995). There is broad public support for such programs. There is also substantial support for expanding the current federal criteria for denial of firearm purchase. Results of a recent national survey indicate that, depending on the exact offense, 60-95% of the American public favor broadening the criteria for denial of firearm purchase to include persons convicted of selected misdemeanors (Johns Hopkins Center for Gun Policy and Research and National Opinion Research Center 1997).

However, the effectiveness of the denial of firearm purchase in reducing rates of criminal activity has never been established. There is great interest in measuring the effectiveness of denial policies; such information would have obvious and immediate public policy implications. We have previously completed a study of the effectiveness of denying handgun purchases by felons in California; denial was associated with a decrease in rates of recidivism that averaged 20-30% and was substantially higher for some groups (Wright, Wintemute et al. 1999). Scholars at a 1997 meeting of the Homicide Research Working Group, however, agreed that a nationwide evaluation of the Brady Act would be difficult, and perhaps impossible, to conduct adequately (Kleck 1997; Webster 1997).

We report here on a large-scale controlled assessment of the effect of denial of handgun purchase on rates of subsequent criminal activity among violent misdemeanants in California. In 1991, California's criteria for denial of handgun purchase were expanded to include prior convictions for any of a list of specified violent misdemeanors. The prohibition remained in place for ten years following the conviction.

Our primary *a priori* hypothesis was that, in an analysis that adjusted for other known risk factors for future criminal activity, persons who were denied the purchase of a handgun in California in 1991 as a result of a conviction for selected violent misdemeanors would have rates of subsequent violent criminal activity that were significantly lower than those among misdemeanants who purchased handguns in 1989 or 1990, before the new criteria became operative. This effect, we proposed, would be greatest for those offenses involving firearms and/or violence.

At the same time, we assessed the independent effects of demographic factors and the nature and severity of prior criminal history on the subsequent rates of criminal activity among authorized purchasers of handguns and persons denied such purchases.

BACKGROUND

The Problem of Firearm Violence

Rates of violent crime remain unacceptably high. In 2000 an estimated 544,000 firearm-related violent crimes were committed in the United States, including approximately 10,180 firearm homicides (FBI 2001; Rennison 2001). During 1992-1998, an average 27,700 persons each year suffered nonfatal assaultive gunshot wounds (Simon, Mercy et al. 2001). The aggregate cost of firearm violence has been estimated to be $100 billion per year (Cook and Ludwig 2000). The costs associated with firearm injuries themselves are substantial: an estimated $20 billion in lifetime costs for firearm injuries sustained in 1990, of which at least 80% are borne by public funds (Wintemute and Wright 1992; Max and Rice 1993).

Moreover, offenders armed with a firearm are substantially more likely to complete some violent crimes, particularly rape, than are offenders armed with other weapons (BJS 1986; Rand 1990; Rand 1995). Firearm use particularly appears to facilitate violent crime in which the perpetrator is a stranger to the victim; such crimes now constitute a majority of all violent crimes in the United States (Rennison 2001).

Firearms are not all at the same risk for use in violent crime. Handguns constitute approximately 40-45% of all firearms manufactured in the United State each year (Unpublished data, BATF) but are used in at least 80% of all violent crimes involving firearms (FBI 1996; Perkins, Klaus et al. 1996). Many policies intending to prevent firearm violence focus specifically on handguns.

And crime guns tend to be newly, or recently, released into circulation. In 1999, the most recent year for which data are available, the median age of recovered crime guns was 5.7 years; for some frequently-recovered guns the median time from first sale to recovery was under three years (BATF 2000). By contrast, private gun owners report that they have owned nearly two-thirds of their guns for six years or more; the average time since acquisition is 12.8 years, and some portion of these guns were acquired used (Cook and Ludwig 1996). This suggests that policies seeking to prevent the flow of new guns into criminal hands might be particularly effective.

Research on Regulating the Purchase, Carrying, and Use of Firearms

Surprisingly little recent research has been conducted on illegal commerce in and use of firearms, considering the size of the problem itself and the number of policies that have been promulgated to address it. This section reviews the most pertinent studies.

One increasingly widespread policy is that of targeted street-level enforcement of laws forbidding the carrying of concealed weapons without permits. This policy has become widespread in part because of the favorable results of an evaluation of a pilot program in Kansas City (Sherman, Shaw et al. 1995). In that study, increased police patrols targeting firearm confiscation were associated with a modest increase in the number of firearms confiscated and a 49% decrease in the incidence of gun crimes. Similar changes were not seen in a control area. The evaluators concluded that both general and specific deterrence of gun carrying may have resulted from the increased police patrols.

The impact of mandatory sentencing laws for gun crimes, a widely implemented and widely-supported strategy, has also been evaluated (McDowall, Loftin et al. 1992). McDowall and colleagues conducted six independent time series analyses in cities in four eastern states. Data for the individual cities did not provide consistent support for an effect of mandatory sentencing. Pooling the results from all six cities provided what the authors described as "exceptionally strong support" for an effect on homicide, but little effect on gun assault or robbery. Compatible results have been seen in evaluations of a Massachusetts law imposing *per se* enforcement and mandatory sentencing for the illegal carrying of concealed firearms (Beha 1977A)(Beha 1977B). However, in an analysis of nearly all such laws using a multiple time series design -- but, in what may be a significant design flaw, using all other states as controls for any one state -- Marvell and Moody found that such "laws produce any impact in no more than a few states and that there is little evidence that the laws generally reduced crime or increased prison populations" (Marvell and Moody 1995).

Several evaluations have recently been conducted of policies that seek to lower rates of violence by increasing, rather than decreasing, the percentage of the population that is armed while in public. These laws create a mandate for local law enforcement agencies to issue concealed carry permits to persons who request those permits and are legally able to purchase and own firearms.

Individual evaluations yielded results that were frequently interpreted as contradictory but which in fact suggest that shall issue policies had little, if any, effect on crime rates. The first such study examined effects of shall issue policies on homicide rates in five metropolitan areas in Florida, Mississippi, and Oregon (McDowall, Loftin et al. 1995). Homicides increased in four of

the five sites and decreased in the other. One of the four increases and the one decrease were statistically significant. On average, homicides rose 25% after shall issue policies were adopted, but the authors cautioned that the variation between sites made this an unreliable result.

Another study, this one widely publicized, examined trends in county-level crime rates in ten states that adopted shall issue policies (Lott and Mustard 1997). There were decreases of 5 to 8% in most violent crimes and increases, which the authors considered to be compensatory, in property crimes. But when others examined data for individual states, they found neither consistent increases nor decreases. As with child access prevention laws, many of the critical results could not be reproduced with Florida removed from the analysis (Black and Nagin 1998). Criminologist Gary Kleck concluded that most likely "the declines in crime coinciding with relaxation of carry laws were largely attributable to other factors," and not to the laws themselves (Kleck 1997B, p 376).

A related study determined that the decrease in homicide in the postlaw period in states that adopted shall-issue policies consisted almost entirely of a decrease in juvenile homicides (Ludwig 1998). Homicide rates for adults may even have increased. The significance of this finding is that juveniles, who could not obtain concealed weapons permits under any circumstances, could not have been protected by more liberal access to these permits. This study also found wide variation across individual states.

The reason for the lack of a clear effect is now emerging. About 7% of adults — 3.4 million persons — carry firearms in public on a regular basis and for reasons not related to their work (Cook and Ludwig 1996). Of these, 22% carry every day and 10% carry at least one-half the time; some 900,000 people may be carrying firearms on their person on a typical day. In

states that adopted shall issue policies, typically no more than 1 or 2% of the eligible population requested a permit (Ludwig 1998), and a number of these new permittees probably carried firearms already. It is doubtful that the frequency of weapon-carrying was significantly affected by the adoption of shall issue statutes.

A wide array of policies regulate the purchase of firearms. Recently, attention has focused on the purchase of multiple firearms on a single occasion or within a short period of time. ATF tracing data show that, among recently purchased and traced guns, those bought in multiple purchases were particularly likely to have had an attempt made to obliterate their serial numbers — a clear indication of criminal intent (BATF 2000). Weil and Knox recently evaluated the effect on gun trafficking of a Virginia law that limited handgun purchases to one per month (Weil and Knox 1996). The percentage of gun traces initiated in the so-called northeast corridor states -- New York, New Jersey, Connecticut, Rhode Island, Massachusetts -- that identified guns as being transported from Virginia was 35% before the passage of the law and 16% afterwards. The authors concluded that, in this case at least, regulating the rate of handgun purchase had substantial beneficial effects on firearms trafficking.

A number of lines of research have suggested that limiting ease of access to firearms for entire populations is associated with decreased rates of firearm violence. Sloan and colleagues, for example, compared rates of homicide and other violent crimes in Seattle and Vancouver (Sloan, Kellermann et al. 1988). They asserted that the two cities were similar with respect to most risk factors for firearm violence, but differed substantially in the degree to which they regulated sale and possession of handguns. They found selective increases in rates of firearm-related violent crime in Seattle, as compared to Vancouver. For homicides, they demonstrated

that this rate was specific to handgun crimes. Cook has reviewed a number of other studies on this point (Cook 1991).

Finally, recent studies have examined the effect of banning outright the purchase of specific classes of firearms. Loftin and colleagues studied the effect of restrictive licensing of handguns on homicide and suicide in the District of Columbia (Loftin, McDowall et al. 1991). Adoption of the law was associated with a 25% reduction in firearm homicide that became evident almost immediately. There was no compensatory increase in homicide by other means in the District of Columbia, nor were there similar reductions in firearm homicide in nearby Maryland or Virginia. Other observers have criticized this study for terminating follow-up in 1987, after which homicide again rose coincident with the appearance of crack cocaine.

A ban on specified assault-type firearms was enacted as part of the 1994 Crime Bill, and in 1998 the Clinton administration halted the manufacture and importation, but not sale, of large-capacity semiautomatic "copy cat" rifles that had been designed to avoid the prior bans on technical grounds (BATF 1998). The ban imposed by the 1994 Crime Bill has been evaluated by researchers at the Urban Institute (Roth and Koper 1997; Roth and Koper 1999). In the short run the ban appeared to have beneficial, but modest, effects. In the first year and a half after the ban became effective, trace requests to ATF fell by 20% for banned weapons but just 11% for other guns. There was no such decrease in traces in this period in those states where assault-type firearms had been banned earlier. In St. Louis and Boston, where all confiscated firearms were traced, traces for banned weapons fell 29% and 24%, respectively. The ban may have contributed to a 7% drop in firearm homicide from 1994 to 1995, but it was not clear at that

time whether the decrease represented a downward trend or simple year-to-year variation. A re-evaluation over a longer time period is underway.

A number of jurisdictions acted to ban domestic production and sale of the poorly made, inexpensive handguns known as Saturday night specials. By 1997, four states had established a minimum melting point criterion for the metal used to produce gun frames; the inexpensive zinc alloy from which these guns are often made has a lower melting point than does high grade steel. In California, more than 40 cities and counties sought to eliminate Saturday night specials by outlawing the manufacture and sale of guns that failed to meet a series of design and materials criteria. Results varied, apparently as a result of variable monitoring and enforcement (Wintemute 2000A).

In 1989, Maryland created a Handgun Roster Board to develop a list of handguns that could legally be manufactured or sold in the state. The board was required to consider such characteristics as size, quality of materials, reliability, and suitability for sporting use, among others; no specific standards were set (Teret, Alexander et al. 1990). A preliminary evaluation of the impact of the Maryland law has been completed. As with assault-type weapons, there was a substantial increase in sales of non-approved guns prior to the law's effective date. Nonetheless, non-approved guns accounted for a progressively smaller percentage of crime guns confiscated by law enforcement agencies (Vernick, Webster et al. 1998). The effect of the ban on crime was unclear; crime rates did not fall appreciably faster in Maryland than in neighboring states without similar legislation (Webster, Vernick et al. 1998).

Denial of Firearm Purchase

The Gun Control Act of 1968 specified classes of persons who were prohibited from purchasing or possessing firearms. Other classes have been added by subsequent legislation. Today, these classes include convicted felons, persons under felony indictment, persons convicted of domestic violence misdemeanors or subject to domestic violence restraining orders, illegal aliens, controlled substance addicts, persons adjudicated mentally ill, and others. This intervention seeks to be effective early in the chain of events leading to firearm violence, regulating the acquisition of firearms rather than their use.

The clear presumption behind this policy is that members of the prohibited classes are at unacceptable risk for future criminal activity involving firearms. In some cases this presumption is well supported. For example, a large body of evidence has established that persons with a prior history of criminal activity are more likely than persons without such a history to do crime in the future. Among many others, (Blumstein, Cohen et al. 1986; Tillman 1987; Tracy, Wolfgang et al. 1990; Greenberg 1991). In other cases the picture is less clear. Some commentators have suggested that these classes are over-inclusive, and that persons with mental illness and noncitizens are arguably at no greater risk for criminal activity than are others (Jacobs and Potter 1995).

It has also been argued that these criteria are not inclusive enough. No jurisdiction denies firearm purchase to all persons having a criminal history, and many thousands of persons with criminal histories legally purchase firearms every year. Given that a prior criminal history is a well established risk factor for future criminal activity, the possibility therefore exists that identifiable subgroups of authorized handgun purchasers are at increased risk for later criminal

activity. This is not just a theoretical concern; one commentator had suggested that "a considerable fraction of people who commit violent crimes are legally entitled to own guns" (Cook and Blose 1981).

Our own research has established that, among legal purchasers of handguns in California, those with a prior criminal history are at substantially increased risk for criminal activity after handgun purchase (Wintemute, Drake et al. 1998). We undertook a retrospective cohort study of 5,923 authorized purchasers of handguns in California in 1977 who were younger than 50 years of age, identified by random sample. These purchasers acquired their handguns long before California law prohibited selected misdemeanants from purchasing handguns; all study subjects passed mandatory criminal records background checks. Our main outcome measures were incidence and relative risk (RR) of first charges for new criminal offenses after handgun purchase. Follow-up to the end of the 15-year observation period or to death was available for 77.8% of study subjects and for a median 8.9 years for another 9.6%. Handgun purchasers with at least one prior misdemeanor conviction were more than seven times as likely as those with no prior criminal history to be charged with a new offense after handgun purchase (RR, 7.5; 95% confidence interval [CI], 6.6-8.7). Among men, those with two or more prior convictions for misdemeanor violence were at greatest risk for nonviolent firearm-related offenses such as weapon carrying (RR, 11.7; 95% CI, 6.8-20.0), violent offenses generally (RR, 10.4; 95% CI, 6.9-15.8), and Violent Crime Index offenses (murder or non-negligent manslaughter, forcible rape, robbery, or aggravated assault) (RR, 15.1; 95% CI, 9.4-24.3). However, even handgun purchasers with only one prior misdemeanor conviction and no convictions for offenses

involving firearms or violence were nearly five times as likely as those with no prior criminal history to be charged with new offenses involving firearms or violence.

As a practical matter, the enforcement of a policy to deny firearm purchase to specified classes of persons has been contingent upon the enactment of mandatory background checks for persons seeking to purchase firearms. At the national level, this became possible only in 1994 following the enactment of the Brady Handgun Violence Prevention Act. The Brady Act required a five-day waiting period prior to handgun purchase, and initially also required a designated state or local chief law enforcement officer to conduct a criminal records background check. The latter requirement was declared unconstitutional by the Supreme Court in June 1997. Most chief law enforcement officers continued to perform background checks on a voluntary basis.

By 2000, when The Brady Act had been in operation for seven years, all states and federal agencies together had screened a total of 30 million applications to purchase guns and had issued 689,000 denials. In 2000, 42% of denials were for reasons other than felony conviction or pending indictment (Bowling, Lauver et al. 2001).

Procedures for screening handgun purchasers in the states operating under Brady Act procedures were reconfigured in November 1998. Both the waiting period and the background checks conducted by state or local law enforcement agencies were replaced by a National Instant Check System (NICS) administered by the FBI. During NICS' first year of operation, nearly 90% of background checks were completed within two hours of application; 72% were completed within 30 seconds. Difficult checks could take several days, however, and the law allowed dealers to release firearms to purchasers after three business days, whether or not the

background checks were completed. By the end of 1999, 3,353 prohibited persons, most of them felons, had acquired firearms in this manner; just 442 had surrendered their guns. Federal law enforcement experts have suggested that this problem would largely be eliminated if the waiting period for firearm purchases were lengthened (FBI 2000; GAO 2000).

California has required the recording of all sales of firearms on a Dealer's Record of Sale (DROS) form since 1917. Background checks have been conducted since the late 1960s following standardized procedures. There has been a mandatory waiting period to allow the background check to be conducted, which was shortened from 15 to ten days in 1997, after our study period. In 1991, the background check requirement was extended to include sales between private parties. In addition, the criteria for denial of firearm purchase were expanded to include prior convictions for a number of violent misdemeanors. The most important of these were misdemeanor assault and battery, brandishing a firearm, and discharging a firearm. A complete listing is in Table 1.

At the time this study was undertaken, California procedures were as follows: The prospective purchaser and the selling dealer completed a DROS form. A copy was forwarded to the California Department of Justice (CDOJ) in Sacramento; another was sent to the chief law enforcement officer of the jurisdiction in which the subject resided. CDOJ personnel searched the state's criminal history and mental health records databases for records pertaining to this applicant, using a sophisticated Soundex matching system. They also queried national databases for records maintained in other states. If records were identified, they were reviewed for disqualifying events. If incomplete information existed, such as arrests without dispositions, contact was made with the appropriate agencies; many of these contacts were with agencies in

other states. Additional information was obtained from mental health personnel and others as needed.

If dealers do not receive a negative report within the allotted time, the sale is consummated. With some variation from year to year, 1.5-2.5% of sales are denied. Under California law, as distinct from federal law, sales that are put on "delay" status by CDOJ screeners may not be consummated when the waiting period ends, but only after CDOJ has obtained the information needed to make a final determination of the prospective purchaser's eligibility. Additional sales (well under 1%) are therefore denied initially and later permitted, sometimes after the passage of weeks to months, when this critical missing information becomes available.

Incapacitation is the principal mechanism by which denial of firearm purchase is thought to lower crime rates: such policies are intended to deprive high-risk persons of access to firearms, and thereby reduce their capacity for committing violent crimes. The effectiveness of these policies might therefore be expected to vary directly with the importance of firearm use in affecting completion rates. Thus, the impact of these laws should be greatest for gun and/or violent crime. In the case of homicide, the weapons effect is very substantial (Cook 1991). This also appears to be true for robbery (Rand 1995). One might hypothesize an additional deterrent effect, particularly in a legal environment such as California's that includes "three strikes" or similar legislation. A prospective firearm purchaser would be aware that his or her criminal history is known to the Justice Department. This might deter some potential offenders from incurring further "strikes." However, a number of critics have questioned whether these laws have any substantial deterrence effect, and one analysis has associated them with a substantial

increase in homicide, both immediately and over the long term (Marvell and Moody 2001).

It is possible that the main effect of such policies in much of the United States is simply to deter ineligible persons from acquiring firearms from licensed firearms dealers, leaving them free to acquire firearms by other methods instead. Cook and colleagues have defined two markets for firearms: a primary market consisting of sales made by holders of federal firearms licenses and a secondary market consisting of all other gun sales, licit or illicit (Cook, Molliconi et al. 1995). Cook and Ludwig estimate approximately a 60:40 ratio in sales between the primary and secondary markets. And they note that, "the secondary market will look increasingly attractive as the regulations governing the primary market become more restrictive" (Cook, Molliconi et al. 1995, pg 71). There is evidence to support this position. In the 1991 Survey of State Prison Inmates, half of those who purchased their most recent handgun from an illegal source stated that they had not bought the weapon from a retail store because of concerns about a background check (BJS 1994).

Waiting period and background check policies, in that they only affect sales by licensed dealers, clearly are targeted at the primary market. However, the primary market may be of more importance, even for high risk purchasers, than is commonly supposed. In that same 1991 survey, those who used a handgun in the offense leading to their incarceration were as likely to have purchased that firearm from a licensed dealer as from "the black market, a drug dealer, or a fence" (Beck, Gilliard et al. 1993). And "sales by licensed firearm dealers" has a broader meaning in some jurisdictions than others. California and several other states have effectively outlawed the secondary market, requiring that almost all transfers of firearms between private parties be routed through a licensed dealer so that a background check could be conducted. The

California law took effect in 1991, at the same time that the state's broader denial criteria became operative. This might be expected to enhance the effect of expanded denial criteria, by making it more difficult for prohibited persons to make illegal purchases. But enforcement is problematic. California maintains a computerized archive of all transfers of handguns that are conducted by FFLs. Based on the Cook and Ludwig estimate, we would expect perhaps 40% of these records to indicate that they concerned private party transfers facilitated by FFLs. But in actuality, fewer than 10% of the records so signify.

Critics have suggested that easy access to the secondary firearms market renders waiting period/background check programs ineffective. Jacobs and Potter, for example, argue that the regulatory goals of such policies far exceed their regulatory capacity and that their chief effect is to create pressure for straw purchases and purchases in the secondary market. They consider such policies to be nothing more than "a sop to the widespread fear of crime" (Jacobs and Potter 1995).

However, Cook and colleagues have argued that the effect of denial policies should not be considered in isolation (Cook, Molliconi et al. 1995). They may work synergistically with enhanced sentences for and enforcement of illegal possession statutes that make acquisitions in the secondary market less attractive. Their incapacitative effect could be enhanced by extending their scope, as has been done in California by requiring all private party sales to be routed through a licensed dealer.

Moreover, criticism such as that of Jacobs and Potter must be seen as speculation in the absence of data on whether these policies produce their intended final effect: reducing rates of

criminal activity among those whose primary-market handgun purchases are denied. It is that outcome that the present proposal addresses.

We have already conducted a small-scale evaluation of the denial of firearm purchases by felons (Wright, Wintemute et al. 1999). We examined a sample of persons who were denied handgun purchase in California in 1977 on the basis of a prior felony conviction and a sample of those whose handgun purchases were approved although they had a prior felony arrest (this group had no felony convictions or other disqualifying events.) Subjects were followed for three years. In multivariate analysis, the arrestees whose purchases were allowed were at greater risk for offenses involving a gun (Relative Risk (RR)= 1.2, 95% Confidence Interval (CI), 1.1-1.4) or violence (RR= 1.2, 95% CI, 1.1-1.4). Among those having only a single prior arrest for an offense involving weapons or violence, those whose handgun purchases were approved appeared to be at substantially increased risk for a new gun offense (RR= 2.7, 95% CI, 0.4-19.5) or violent offense (RR= 3.9, 95% CI, 0.6-28.3); the small sample sizes limited the power of the analysis.

These findings suggest that, even among serious offenders, denial of handgun purchase may lower rates of expected criminal activity for offenses involving firearms or violence by 20-30% and much more for some subgroups. Additional preliminary evidence comes from McDowall and colleagues' study of Florida's "shall issue" statute. They observed a decline in homicide rates in that state beginning only several years after its "shall issue" statute was enacted and roughly contemporaneous to its adoption of a waiting period and background check requirement (McDowall, Loftin et al. 1995).

In 2000, after the study we report on here had been largely completed, Ludwig and Cook published an evaluation of the Brady Handgun Violence Prevention Act that compared homicide

trends in states where the act led to new screening programs for gun purchasers with trends in homicide in states that had pre-existing screening programs. They found no significant difference in homicide rates in the two groups in states, and their findings have been widely interpreted as demonstrating that Brady has been ineffective.

It can be argued, however, that the outcome of their study was determined by the method chosen. The law is designed to affect the behavior of a very small part of the likely population at risk. Using a population-wide outcome measure, rather than one pertaining to those directly affected, means that a real effect may well be overlooked. A population-wide outcome measure would be appropriate an intervention that impacts an entire population, but that is not what gun purchaser screening programs do. Consider as an analogy a vaccine trial, in which an intervention is taken to prevent an adverse outcome. The proper assessment of that vaccine is in its effect on those vaccinated, as compared to others; population-based results would not be accepted. In the case of Brady, the number of persons affected is small enough that even a complete and permanent elimination of homicide risk in that affected population would probably not be reflected in any discernible change in population-wide homicide rates (Wintemute 2000C).

Long-Term Studies of Criminal Behavior

In this study, the independent effect of the denial of legal purchase of a handgun on subsequent rates of criminal activity among identified persons at risk, not entire populations, is the primary subject of interest. We therefore very briefly review here selected longitudinal

studies of criminal behavior. To our knowledge, no studies other than our own have been conducted on criminal behavior among legal purchasers of firearms.

The importance of gender as a risk factor both for initial arrest and for recidivism has been well established (Blumstein, Cohen et al. 1986). Race/ethnicity is also related to substantial differences in rates of first arrest but generally not to rates of recidivism (Blumstein and Graddy 1982; Blumstein, Cohen et al. 1986; Tracy, Wolfgang et al. 1990; Greenberg 1991). When race/ethnicity is taken into account, the effect of socioeconomic status appears to be relatively minor and inconsistent (Tittle and Meier 1990; Visher, Lattimore et al. 1991). The number of prior offenses is also strongly correlated with the likelihood of new offending (Tillman 1987; Greenberg 1991).

Previous longitudinal studies have used a variety of measures of criminal behavior. One such measure is self report, which is not available to us. Studies making use of records have variably relied on arrest, conviction, violations of probation or parole, and others. As one of our study cohorts has no prior criminal history, only arrest and conviction are applicable to all subgroups of our study population. Each has strengths and drawbacks. The use of arrest alone creates the possibility of misclassification on the basis of false positives, or Type 1 errors. The use of arrest is widespread, however (Belkin, Blumstein et al. 1973; Blumstein and Graddy 1982; Tillman 1987; Beck and Shipley 1989). Crimes rates estimated from documented arrest histories are similar to those derived from self report data (Blumstein and Cohen 1979). Sole reliance on conviction, even assuming that dispositions are always available, creates a high likelihood of a Type 2 error, or misclassification based on false negatives. The majority of felony arrests do not result in felony convictions, even when there is substantial evidence of guilt. Many other causes

for nonconviction exist (Maltz 1984). Our own prior longitudinal studies have used data for both arrests and convictions. We have found that results based on conviction are quite similar to those based on arrest (Wintemute, Drake et al. 1998).

METHODS

Overview

This is a historical cohort study. Subjects are identified and classified as to their characteristics as of a certain point in the past and followed forward in time, toward the present.

We have taken the critical exposure in this study to be the legal purchase of a handgun. Our primary study cohort, the denied cohort, is by this definition the unexposed cohort: persons who were denied the purchase of a handgun in 1991 because of a prior conviction for a violent misdemeanor within the preceding ten years. This was the first year in which such convictions were grounds for denial. Our comparison co hort, the exposed or purchaser cohort, is made up of persons whose applications to purchase handguns in 1989 or 1990 were approved and whose criminal records at that time contained a conviction within the preceding ten years for an offense which would have been disqualifying had they sought to purchase handguns in 1991.

Subjects were followed for three years from the date 15 days after the date on their application for handgun purchase. This is the earliest date on which handgun acquisition could have occurred given the length of California's mandatory waiting period at the time. The outcomes of major interest were rates and relative risks of arrest and conviction for new offenses, particularly those involving firearms, other weapons, and/or interpersonal violence. Arrests and convictions for other offenses were also examined to assess the specificity of any observed effect with denial of handgun purchase.

Because offenses occurring in other states were likely not to appear on California's criminal records, only those subsequent offenses occurring in California were identified as

outcome events. To establish that study subjects remained at risk for such events, records linkage procedures that we have refined in previous studies were used to verify that subjects' continuing residence in California.

Data Sources

Dealer's Record of Sale File: Since the early 1970s, selected data elements from California's Dealer's Records of Sale (DROS) forms for all approved handgun purchases have been computerized. The files for 1989 and 1990 were used as the sampling frame for our control or purchaser cohort. If the CDOJ background check identifies a criminal record for a person whose handgun purchase is eventually approved, that person's unique Criminal Identification and Information (CII) number is added to the computerized record of that approved purchase. Thus, it is possible to identify prior to sampling those persons who have a criminal history at the time of their approved handgun purchase.

The computerized record also includes the unique record number for the Dealer's Record of Sale form; this number is used by CDOJ as the identifier for that particular handgun purchase. Not all of the data elements on the DROS form are entered into the automated file. However, originals or microfilm copies of the reports are retained by CDOJ. These were made accessible to us.

Prohibited Persons File: Since 1989, a computer file of elements of all applications that are denied has also been maintained. This file contains personal identifiers, the unique Dealer's Record of Sale number for the denied purchase, the CII number for all persons having a criminal history, and the reason for denial. For those denied as a result of prior criminal activity, the

computer file includes the specific offense for which a conviction that resulted in the denial. CDOJ provided us with a copy of this file for 1991, which we used to identify all persons whose applications for handgun purchase were denied as a result of prior violent misdemeanor convictions.

Longitudinal File: California's Adult Criminal Justice Statistical System Longitudinal Database was created to allow batch sorting of subjects with criminal histories for research purposes (CDOJ, 1985). It contains complete identifier data, including the unique CII number, and salient criminal history transaction data on all persons whose adult criminal history records began in 1974 or subsequently. Thus, it contains these data for all persons who reached the age of 18 on January 1, 1974 or later (and would therefore have been 35 years of age or younger in 1990). Records in the longitudinal file may be sorted and retrieved by any of the automated variables and nested sorts can be performed. Thus, the file can be used to produce a list of all persons with criminal histories in California who have selected demographic and or criminal history characteristics.

From this file, CDOJ provided us a registry of all persons who reached 18 years of age on or after January 1, 1974 who, in 1990 or earlier, had been convicted of one of those violent misdemeanor offenses that became grounds for denial of handgun purchase in California in 1991.

Criminal History System: The Criminal History System (CHS) contains data on all adults arrested in California. These criminal records include extensive personal identifier information to maximize the possibility that a newly arrested person will be linked to his prior criminal record. In a trial run involving several hundred handgun purchasers known by us to have criminal histories, we verified a 100% "hit" rate.

The quality and completeness of data in CHS are high. In the late 1980s, other researchers established that felony dispositions were available in at least 80% of cases in California, compared with only 40-60% nationally (Orsagh 1989). In 1991 we performed a pilot review of several hundred rapsheets to validate the data quality and establish our abstracting procedures. This review determined that nearly 80% of *all* dispositions, whether felony or misdemeanor, were available. Consequent to that time a backlog of the entry of new criminal justice transactions into CHS developed (BJS 1995). That backlog has since been cleared. The criminal history records we obtained for this study show arrests that occurred within a few weeks of our request for the records.

Since the early 1970s, CHS has been subject to an episodic records purge designed to remove inactive records. Records become eligible for removal following specified criteria; mandatory retention periods are related to the nature and severity of an individual's criminal history. No offense involving weapons or interpersonal violence may be purged, and no record containing any such offense can be purged before the subject reaches age 70. Records for persons whose handgun purchase is denied are maintained until the subject's 100th birthday (CDOJ 1990). As a result, the purge process has had minimal impact on our ability to obtain records for study subjects.

Cohort Assembly

Last name and date of birth were used to identify tentative matches between persons listed in the 1989-1990 handgun purchaser data and persons recorded in our extract of the longitudinal file as having violent misdemeanor convictions by 1990. All tentative matches were

confirmed by manual records review. Criminal records for all subjects in both cohorts were reviewed to verify that each had a disqualifying violent misdemeanor conviction within ten years of actual or attempted handgun purchase.

We identified 1,099 persons under age 35 whose handgun purchases had been denied for a prior violent misdemeanor conviction in 1991, and 877 persons under age 35 who had purchased handguns in 1989 or 1990 and within the preceding ten years had been convicted of a violent misdemeanor that became grounds for denial in 1991. We excluded 23 persons from the denied cohort who appeared to have been denied in error: 22 whose convictions were more than ten years prior to the date of their handgun purchase applications and one whose conviction was for a crime that did not constitute grounds for denial. Another 90 persons purchased handguns in 1989 or 1990 and then were denied when they attempted to purchase handguns in 1991. Preliminary analyses performed with these persons included and excluded yielded nearly identical results, and they were therefore excluded.

Power calculations were based on results from our prior studies. We found that a previously arrested cohort of successful gun purchasers under 50 years of age and having a prior criminal history would experience approximately a 40% incidence of arrest for all offenses and a 20% incidence of arrest for violent crimes or less serious weapons offenses over a defined period of follow-up, with most first arrests occurring within a few years of the onset of follow-up. Recidivism for younger offenders will be higher (Beck and Shipley 1989), and these power calculations are therefore conservative.

The sample size requirements were derived from data presented by Breslow and Day (1987 pg 283), and Kahn and Sempos (1989). We predicted that our cohort sizes would be

sufficient to detect relatively small changes in risk with sufficient power. For the outcome arrest for any offense, we would be able to detect a relative risk of between 1.2 and 1.3 in the purchaser cohort, equivalent to a risk reduction of 15-25% in the denied group. For the outcome arrest for an offense involving violence or weapons we would be able to detect a relative risk of between 1.3 and 1.5 in the purchaser cohort, equivalent to a risk reduction of 25-33% in the denied cohort.

Data Acquisition and Management

Dealer's Record of Sale and criminal history records were obtained for members of both study cohorts. Project staff reviewed the records to confirm a match between the study subject and the record supplied.

Data were entered and cleaned by three-member teams. In the case of the DROS records, two team members independently entered each record into computer files. These databases were compared by computer and discrepancies were then resolved by a third team member who consulted the original record.

Similar, but more complex, procedures were used for criminal history data. All data staff were trained by CDOJ's records technicians in criminal history interpretation. Two team members independently abstracted each rapsheet onto a standardized paper form. These forms were compared for obvious discrepancies by a third team member who reconciled them while making reference to the original record. For ambiguous cases the principal investigator was consulted. The paper record was then computerized by two team members working independently, such that there were two separate files for each record. The two files were compared by computer, and all discrepancies were again resolved by the third member of the

team, with consultation by the principal investigator and others as needed. While they were labor intensive, these procedures minimized both abstracting and data entry error.

Data entry was performed in Foxpro for Windows, using specialized screens developed by us. Data comparison was performed in SAS. We used the OCA number, a unique number identifying a specific Dealer's Record of Sale form and thus a specific application for handgun purchase, as our linking identifier for data assembled from multiple sources. The number was added to the rapsheet database as records were key entered.

The following variables, listed here by data source, were abstracted:

From Dealer's Record of Sale Forms/ Data Tape:

Personal Data: Name, Date of Birth, Driver's License number, Criminal Information and Identification number (if present), Social security number (if present), Other identifying number (if present), Sex, Race, Occupation, Local address, Permanent address

Transaction Data: OCA number (unique transaction identifier for this purchase only), Date of transaction, Dealer name, Dealer address, Private sale (yes/no)

From the Prohibited Persons File:

Denial type (Felony conviction, misdemeanor conviction, restraining order, mental health, under age, etc.) , Specific denial offense (e.g. 245 PC for aggravated assault), Out of state offense (Y/N), Denial date

From criminal history rapsheets (in addition to identifiers):

Nature of action, Date, Statute violated (Section, Paragraph, Statute Code), Data source (arrest report, court report, probation or custody report)

The nature of action variable on criminal history rapsheets was coded as follows to allow for detailed specification:

TRANSACTION CATEGORY	ACTION TYPE AND CODE
Charges	Arrest/Cite
	New charge(filed during criminal justice proceedings)
	Arrest--Released-Detention only
	Additional/eXtra charges
Convictions	Conviction, level of offense unspecified
	Felony
	Kid (Juvenile) Convictions
	Misdemeanor

Commitments	DiaGnostic & Narcotics
Applications	Law enforcement, other security
	Concealed Weapon
Other	RegiZtration, Deceased

Crimes were grouped into the following discrete classes: non-gun, nonviolent crimes (e.g., petty theft, driving under the influence of alcohol); nonviolent gun crimes (e.g., carrying a concealed firearm in a public place); and violent crimes (e.g., simple and aggravated assault, robbery, murder).

Our initial intent had been to categorize all crimes as to whether they had involved a gun, violence, both, or neither. This would have permitted us the strongest possible analysis of the effect of the nature of prior offenses on subjects' risk of recidivism, and of the specificity of any effect of the policy we were evaluating. Unfortunately, California's criminal records did not reliably distinguish between violent crimes that involved guns and those that did not. This was particularly important with regard to such offenses as aggravated assault, which may or may not involve a firearm. The state's Penal Code contained separate subparagraphs indicating firearm involvement or its absence but the rapsheets frequently omitted this level of coding. Our records review established that, in the period prior to actual or attempted handgun purchase, convictions for nonviolent gun crimes made up only 4.4% of convictions for all crimes involving guns, violence, or both guns and violence. We therefore defined the main outcome event for the study as the first arrest for a new gun and/or violent crime. Additional analyses provided separate

results for non-gun, nonviolent crimes; nonviolent gun crimes; violent crimes; and all crimes combined.

Verification of At-Risk Status

The follow-up period began 15 days following application for handgun purchase – the first day on which legal acquisition of the handgun could have occurred, if permitted – and ended three years later. Our surveillance for criminal events after handgun purchase was limited to those occurring in California as information on offenses occurring elsewhere was not available. We employed a series of procedures developed by us in earlier research to verify that study subjects remained in California and at risk for outcome events. These procedures relied on data other than records of outcome events, to avoid outcome bias. Following standard procedure for longitudinal studies, follow-up for subjects who could not be independently determined to be at risk throughout the study period was censored as of their last known date of residence in the state.

Our procedures were as follows. Subject identifiers, including a driver's license number when available, were first provided to the state Department of Motor Vehicles for linkage to their driver's license files. As our period of follow-up ended no later than December 31, 1994, nearly all subjects wishing to maintain an active driver's license would have renewed that license after the end of the study period and before our records requests were made in 1999. Our data included a driver's license number for over 90% of all subjects. Subjects were considered to have remained California residents until the date of their most recent license renewal.

For subjects for whom further data was needed, we queried registries maintained by credit agencies and telephone listings. We also queried the California Master Mortality File and social security-derived mortality registries available on the World Wide Web. Finally, a hand search was made of telephone books and registries of property owners available from the California State Library.

Subjects for whom no independent confirmation of continued residence in California could be obtained were excluded from outcome analyses. However, to allow for an estimate of the possible bias introduced by lack of follow-up, data on new arrests were also collected for these subjects and were tabulated for comparison purposes.

Analysis

We originally conducted an analysis that was very similar to that which we had developed and used in prior similar studies. Outcome rates were calculated as incidence density rates using person years at-risk for the denominators and the number of events for numerators (Kleinbaum, Kupper et al. 1982). Rates were standardized by stratification, and relative risks estimated by calculating the ratio of rates. Probabilities and confidence limits were calculated using statistics programs for the comparison of two Poisson distributed rates (Breslow and Day 1987).

Outcome rates were additionally analyzed by Poisson regression (Frome and Checkoway 1985), which allowed more thorough consideration of risk patterns and interactions between risk factors. One set of regressions addressed entire study cohorts. In those regressions, the main effect (explanatory) variables included cohort membership, gender, race/ethnicity, and severity of

criminal history prior to purchase. Separate analyses were performed for each of the outcomes of interest. Two way interactions were tested.

On review, however, we found that risk differentials were time-dependent and determined to reanalyze the data using survival analysis techniques. Reviewers of an earlier version of this report also suggested this modification. In this second analysis, the probability of experiencing a first new arrest was estimated by the Kaplan–Meier method (Kaplan and Meier 1958). The significance of differences in probabilities was assessed by the log-rank statistic.

Cox proportional hazards regression was used to calculate univariate and adjusted relative hazards and 95% confidence intervals (Cox 1972). A model including age, sex, race, and number of prior criminal convictions was used to estimate adjusted relative hazards. Time since actual or attempted handgun purchase was measured in days. Other continuous variables were stratified: age, 21-24, 25-29, and 30-34 years; prior convictions for any crime: one, two, three, and four or more; prior convictions for gun and/or violent crimes: one, two, and three or more. Subjects for whom the number of prior convictions could not be determined (12 persons in the case of prior convictions for any crime, 21 persons for prior gun and/or violent crime convictions) were excluded from multivariate analyses; all were denied persons.

The addition of terms for interactions between study cohort and age, study cohort and number of prior convictions, and age and number of prior convictions did not improve the fit of the model; none were included in the final model. Similarly, inclusion of measures of the elapsed time between the most recent prior conviction for any crime and for any gun and/or violent crime did not improve the fit of the model, and these were not retained. Reliance on the

proportional hazards assumption was validated by plotting Schoenberg residuals for individual covariates against time (Hosmer and Lemeshow 1999).

The primary regression analysis examined risk for experiencing a first arrest. A conditional, total time recurrent-events model was developed to study effects as additional arrests occurred and as time since actual or attempted purchase increased. In the recurrent events analysis an overall effect estimate was generated for each covariate (Prentice, Williams et al. 1981; Hosmer and Lemeshow 1999; Kelly and Lim 2000).

The significance of differences between subjects with and without independent follow-up was estimated using the chi-squared statistic.

All tests of significance were two-sided, with a P value of <0.05 considered to indicate statistical significance. SAS software was used for all analyses (PC-SAS, Version 8, SAS Institute, Cary, NC).

RESULTS

After exclusions, the study cohorts were made up of 986 persons who were denied the purchase of a handgun in 1991 ("denied persons") and 787 persons who purchased a handgun in 1989 or 1990 ("purchasers"). The demographic and prior criminal history characteristics of the two cohorts were very similar; 23.1% of denied persons and 27.2% of purchasers had been convicted of more than one violent misdemeanor that had become grounds for denial of handgun purchase in 1991 (Table 2).

Independent evidence of subjects' continued residence in California for the entire three-year follow-up period was available for 83.9% of denied persons and 84.6% of purchasers. Another 10.1% of denied persons and 7.8% of purchasers were confirmed as alive and in the state for part of the follow-up period (median 1.7 years for both groups). No follow-up information was available for 119 subjects. Absence of follow-up was not related to subjects' study cohort (7.6% (n=60) for purchasers and 6.0% (n=59) for denied persons, P=0.172), sex (P=0.564), age group (P=0.892) or number of prior convictions for any crime (P=0.084) or gun and/or violent crimes (P=0.295).

Over three years following their actual or attempted handgun purchases, 546 (33.0%) of 1,654 subjects with follow-up were arrested for a new crime, including 296 (31.9%) of 927 denied persons and 250 (34.4%) of 727 purchasers (Table 2). Purchasers were more likely than denied persons to be arrested for a new gun and/or violent crime (23.9% and 20.1% respectively, log-rank P=0.048)(Figure 1a), but not for a new non-gun, non-violent crime (21.3% and 22.8%, respectively, log-rank P=0.461)(Figure 1b).

Among the 119 subjects with no follow-up, purchasers were more likely than denied persons to experience a new arrest for any crime, (46.7% and 28.8%, respectively, P=0.044), a non-gun, nonviolent crime (33.3% and 23.7%, respectively, P=0.245), and a gun and/or violent crime (31.7% and 22.0%, respectively, P=0.235). Among purchasers, the crude incidence of arrest was substantially higher for those without follow-up than for those with follow-up available -- by an absolute 12.3% for any crime, 12.0% for non-gun, non-violent crimes, and 7.8% for gun and/or violent crimes. For denied subjects, these absolute differences were much smaller and, in the case of arrest for any crime, reversed. The crude incidence of arrest among denied persons without follow-up, as compared to those with follow-up, was 3.1% lower for any crime, 0.9% higher for non-gun, non-violent crimes, and 1.9% higher for gun and/or violent crimes.

The results of univariate analysis are presented in Table 3. Crude first-arrest rates for new gun and/or violent crimes were 9.9/100 person-years (py) for purchasers and 8.0/100 py for denied persons (Relative Hazard (RH), 1.23; 95% Confidence Interval (CI), 1.00-1.52). There was no significant difference between the two groups in risk of arrest for non-gun, nonviolent crimes. Among purchasers the arrest rate for gun and/or violent crimes exceeded that for non-gun, nonviolent crimes; among denied persons the opposite was true. When both denied persons and purchasers were considered together, males were at increased risk of arrest for gun and/or violent crimes; risk of arrest for all crime categories was strongly related to age (Table 2, Figure 2) and number of prior criminal convictions (Table 3, Figure 3).

These results were generally confirmed in multivariate analysis (Table 4). Purchasers remained more likely than denied persons to be arrested for new gun and/or violent crimes (RH,

1.29; 95% CI, 1.04-1.60) but not for non-gun, non-violent crimes (RH, 0.96; 95% CI, 0.78-1.19). Adjusted risk of first arrest for all crime types decreased by more than 50% as age increased. Risk of arrest increased for all crime types with the number of prior convictions for any crime, but an increasing number of prior convictions for gun and/or violent crimes was associated only with an increased risk of arrest for new crimes of that type.

When nonviolent gun crimes and violent crimes were considered separately, results were similar to those for all gun and/or violent crimes considered together. After adjustment, purchasers were more likely than denied persons to be arrested for both violent crimes (RH, 1.24; 95% CI, 0.98-1.58) and nonviolent gun crimes (RH, 1.46; 95% CI, 0.98-2.17). For both study cohorts combined, subjects age 30-34 were substantially less likely than those ages 21-24 to be arrested for either violent crimes (RH, 0.49; 95% CI, 0.36-0.67) or nonviolent gun crimes (RH, 0.36, 95% CI; 0.21-0.62). Subjects with three or more prior convictions for a gun and/or violent crime were more likely than were subjects with one such conviction to be arrested for a violent crime (RH, 1.57; 95% CI, 0.97-2.54), but not a nonviolent gun crime (RH, 1.04; 95% CI, 0.38-2.83).

There was relatively little variation across age and prior criminal history strata in the increased risk of arrest for gun and/or violent crimes associated with handgun purchase (Table 5). The increase in risk was modest, and not statistically significant, in many instances.

Over the entire period of follow-up, and including both first and subsequent arrests, the crude arrest rate for gun and/or violent crimes was 10.6/100 py for handgun purchasers and 9.5/100 py for denied persons; rates for non-gun, non-violent crimes were 11.8/100 py and 12.8/100 py, respectively. After adjustment, purchasers were at slightly greater risk of arrest for

gun and/or violent crimes (RH, 1.12; 95% CI, 0.93-1.35) but not for non-gun, non-violent crimes (RH, 0.96; 95% CI, 0.81-1.14). Among subjects who were arrested for gun and/or violent crimes following actual or attempted handgun purchase, denied persons were slightly more likely than purchasers to be arrested more than once for such crimes (25.6% and 24.0% respectively, P=0.120).

COMMENTS

In this population of violent misdemeanants who sought to purchase handguns, risk for subsequent criminal activity was high. One person in three was arrested for a new crime at least once within three years of purchasing a handgun; more than one in five were arrested at least once for a new crime involving guns and/or violence. Risk of arrest was directly related to the number of prior convictions subjects had acquired and inversely related to age, relationships that have been documented previously (Blumstein and Cohen 1979; Blumstein, Cohen et al. 1986; Farrington 1987; Tillman 1987; Visher, Lattimore et al. 1991; Wintemute, Drake et al. 1998).

Aggressive efforts to lower the incidence of new crimes among violent misdemeanants appear to be well founded. This may particularly be the case among younger misdemeanants and those with multiple prior convictions, who appear to be at highest risk. However, precisely because of their established pattern of criminal activity, repeat offenders may be less responsive than other misdemeanants to many interventions.

Such interventions operate by one or both of the mechanisms of deterrence and incapacitation. Denial of handgun purchase can be seen as potentially operating by both: deterrence, in that it stigmatizes the behavior of handgun purchase by prohibited persons, and incapacitation, in that it also prevents that purchase, at least from licensed and regulated firearm retailers.

As such, it will be incompletely effective. While some misdemeanants may be susceptible to the level of control embodied in such a policy, others will not. Assuming (erroneously) the existence of entirely complete and up-to-date registries of prohibited persons, no misdemeanants

would be able to purchase guns from licensed retailers; some would not try. But others might falsify their identification, employ a surrogate or straw purchaser, or -- and perhaps most commonly -- purchase guns from unlicensed and unregulated private vendors. Nationwide, perhaps 40% of all firearm transfers involved these vendors (Cook and Ludwig 1996). While licensed retailers must identify prospective purchasers, initiate background checks, and keep records, unlicensed vendors need see no identification, cannot initiate background checks, and need not keep records (BATF 1999).

Nonetheless, denial of handgun purchase was associated with a moderate decrease in risk of arrest for new gun and/or violent crimes, even when gender, age and prior criminal history were taken into account. Several aspects of our findings suggest that this is a causal association. First, it is specific: denial of handgun purchase had no impact on risk for non-gun, nonviolent crimes. Second, it is plausible: reduced access to guns in a high risk population could be expected to reduce their risk of committing new gun and/or violent crimes, but not other crimes. Third, it is consistent: denial of handgun purchase was associated with a reduced risk for gun and/or violent crimes across the ranges of both age and severity of subjects' prior criminal activity. The magnitude of the effect, furthermore, is similar to that seen in an earlier study of the effectiveness of prohibiting handgun purchases by felons (Wright, Wintemute et al. 1999).

Not surprisingly, denial of handgun purchase appears to have its greatest effect in reducing risk for a first arrest for a gun and/or violent crime. Its effectiveness may diminish as time since actual or attempted handgun purchase increases and among subjects who have already incurred new arrests for gun and/or violent crimes.

Three attributes of this study suggest that our findings may have minimized the effect of denial of handgun purchase. First, our study compared persons denied in the first year of the new law to those whose purchases were approved in the two prior years. It can plausibly be argued that those who attempted to purchase guns immediately after it became illegal for them to do so -- and the adoption of the law was widely publicized -- demonstrated a continued willingness to violate laws concerning the possession and use of firearms. It reasonably follows from this that such persons would also be at increased risk for committing gun crimes. Nonetheless, our denied persons manifested a lower risk of crimes involving guns or violence.

Second, as a commentator on an earlier version of this study has noted (Blackman 2001), background crime rates were varying at this time; this raises the possibility that a period effect could account for our results. By simple inspection, as Blackman reports, violent crime rose about 9% in the three years following the approved purchases in our comparison cohort, and fell 7% during the three years following the denials. But this comparison is misleading. If one directly compares the crime rate for the first year of follow-up for the approved purchasers to the crime rate for the first year of follow-up for the denied persons, then compares the respective second years, and then compares the respective third years, a very different pattern emerges. California's violent crime rate was higher during each of the first two years of follow-up for persons denied the purchase of a handgun then during the comparable years of follow-up for those whose purchases were approved. The denied persons were nonetheless at lower risk of arrest for gun and/or violent crimes.

The third concerns the 6.7% of study subjects for whom we were unable to obtain independent follow-up. The proportion of subjects without follow-up was not related to study

cohort assignment (or any other hypothesized risk factor). Among these subjects, purchasers were more likely than denied persons to be arrested for new crimes — by much larger margins than those seen among subjects for whom follow-up was available. Moreover, loss to follow-up was associated with an absolute increase in incidence of first arrest for all types of crime among purchasers, but not among denied persons; including results for persons without follow-up would have raised the incidence of arrest in the former group, but not the latter. These findings suggest that excluding subjects without follow-up has caused us to underestimate both the risk of arrest for new crimes among handgun purchasers and the effects of denial of purchase.

Our findings are subject to several limitations. The small size of the study population limited our statistical power to detect relative risks that were below approximately 1.25, or higher for subgroup analyses. When relative risks are below 1.5, results should be interpreted with caution regardless of the size of the study population due to the potential impact of unmeasured factors.

Rising crime rates may account in part for the puzzling finding that the number of violent misdemeanants seeking to purchase handguns in 1991 was greater than that for 1989 and 1990 combined. Violent crime rates are closely linked to demand for handguns (Wintemute 2000B), and handgun sales in California rose annually between 1986 and 1993. It is also possible that the upsurge in attempted purchases in 1991 represented a misinformed effort on the part of newly-ineligible persons to purchase handguns before the new law was enforced, rather than deliberate attempts to make illegal purchases as discussed above. Accelerated gun sales in anticipation of possible restrictions have been observed previously (Roth and Koper 1997).

Because the criminal records data were not sufficiently specific, we were unable to categorize crimes systematically as involving guns, violence, both, or neither. We were therefore unable to study the specific effect of California's denial policy on risk of arrest for violent gun crimes. We were, however, able to separate nonviolent gun crimes from violent crimes; the results were very similar to those for all gun and/or violent crimes considered together.

It could be argued that the prevention of nonviolent gun crimes, particularly the illegal carrying of a concealed firearm in public, should not be an objective of policies that deny handgun purchases by persons believed to be at high risk of committing gun violence. We would disagree; illegal gun carrying is a necessary precursor to much violent gun crime, and controlled experiments have shown that law enforcement efforts to interdict illegal carrying have had substantial effects on the incidence of gun violence (Sherman, Shaw et al. 1995; OJJDP 1999).

As in other states, information regarding juvenile offenses is frequently missing from the criminal records. As a result, we are to some degree undercounting offenses prior to handgun purchase. However, it is an important aspect of this study that we are relying on data as they are now routinely gathered and maintained by law enforcement agencies.

Finally, this is a single state study, and no two states have adopted the same expanded denial criteria. New Jersey, for example, denies the purchase of a handgun to "any person who has been convicted of a crime" (RJIS 2000). Replications in several states would provide a more general estimate of the effectiveness of denial of handgun purchase.

Critics of programs to screen prospective purchasers of firearms and deny purchases by prohibited persons have suggested that they are unlikely to be effective, describing them in one case as a "sop to the widespread fear of crime" (Jacobs and Potter 1995). They have argued that

persons with criminal intent who are prevented from buying guns in the legal market will simply acquire them illegally. However, the formal, legal gun market is an important source of guns for purchasers with criminal intent. Among state prison inmates who were incarcerated for a crime involving a handgun, that handgun was as likely to have come from a gun store as from an obviously illegal supplier (Beck, Gilliard et al. 1993). And aggressive law enforcement has begun to disrupt the operations of the illegal gun market (Wintemute 2000B). Denial of legal access to handguns may have even greater impact now, as illegal access becomes more difficult, than during our study period.

We note that a recent evaluation of the impact of the Brady Handgun Violence Prevention Act, the federally-mandated waiting period and background check for handgun purchases, did not detect an effect on criminal violence (Ludwig and Cook 2000). That evaluation measured changes in state-level homicide rates from 1994-1998. During those years, however, so few persons were denied the purchase of handguns that their expected 20-25% reduction in risk of committing gun and/or violent crimes (Wright, Wintemute et al. 1999) could not have produced a measurable effect on homicide rates (Ludwig and Cook 2000; Wintemute 2000C).

The evidence presented here suggests that denying the purchase of handguns by violent misdemeanants is an effective means of preventing gun-related and violent crime in a high risk population. However, there are substantial logistic considerations to be addressed before such a policy could be implemented nationwide. No federal registry of violent misdemeanants exists, and it may be difficult to compile one (Tien and Rich 1990; OTA 1991). Such a registry would need to be updated on a continuing basis to prevent newly-ineligible persons from purchasing handguns. As discussed earlier, under the present National Instant Check System (NICS), more

than 3,353 prohibited persons, most of them felons, had inadvertently been permitted to purchase firearms by the end of 1999; their background checks had not been completed within the 72 hours allowed by NICS (GAO 2000). This risk could be minimized by reinstituting a waiting period to allow all background checks to be completed.

REFERENCES

Beck, A., D. K. Gilliard, et al. (1993). Survey of state prison inmates 1991. Washington, Bureau of Justice Statistics.

Beck, A. and B. Shipley (1989). Recidivism of prisoners released in 1983. Washington, Bureau of Justice Statistics.

Beha, J. (1977A). ""And *nobody* can get you out." The impact of a mandatory prison sentence for the illegal carrying of a firearm on the use of firearms and on the administration of criminal justice in Boston. Part I." Boston University Law Review **57**(1): 96-146.

Beha, J. (1977B). ""And *nobody* can get you out." The impact of a mandatory prison sentence for the illegal carrying of a firearm on the use of firearms and on the administration of criminal justice in Boston. Part II." Boston University Law Review **57**(2): 290-333.

Belkin, J., A. Blumstein, et al. (1973). "Recidivism as a feedback process: an analytical model and empirical validation." Journal of Criminal Justice **1**: 7-26.

Black, D. A. and D. S. Nagin (1998). "Do right-to-carry laws deter violent crime?" Journal of Legal Studies **27**: 209-219.

Blackman, P. H. (2001). "Denial of handgun purchase to violent misdemeanants (Letter)." Journal of the American Medical Association **285**: 2715.

Blumstein, A. and J. Cohen (1979). "Estimation of individual crime rates from arrest records." Journal of Criminal Law and Criminology **70**: 561-585.

Blumstein, A., J. Cohen, et al. (1986). Criminal careers and "career criminals". Washington, National Academy Press.

Blumstein, A. and E. Graddy (1982). "Prevalence and recidivism in index arrests: a feedback model." Law and Society Review 1981-1982 **16**(265-290).

Bowling, M., G. Lauver, et al. (2001). Background checks for firearm transfers, 2000. Washington, Bureau of Justice Statistics.

Breslow, N. E. and N. E. Day (1987). Statistical methods in cancer research. Vol II: The design and analysis of cohort studies, Lyon: International Agency for Research on Cancer. **II**.

Bureau of Alcohol, Tobacco and Firearms. (1998). Study on the sporting utility of modified semiautomatic assault rifles. Washington, Bureau of Alcohol, Tobacco and Firearms.

Bureau of Alcohol, Tobacco and Firearms. (1999). Gun shows: Brady checks and crime gun traces. Washington, Bureau of Alcohol, Tobacco and Firearms.

Bureau of Alcohol, Tobacco and Firearms. (2000). Crime gun trace reports (1999). Washington, Bureau of Alcohol, Tobacco and Firearms.

Bureau of Justice Statistics (1986). The use of weapons in committing crime. Washington, Department of Justice.

Bureau of Justice Statistics (1994). Firearms and crimes of violence. Washington, Department of Justice.

Bureau of Justice Statistics (1995). Survey of criminal history information systems, 1993, with supplementary information on pre-sale firearm checks, 1994. Washington, Department of Justice.

California Department of Justice (1990). Criminal record purge and sealing handbook. Sacramento, Criminal Record Purge Unit, California Department of Justice.

Cook, P. J. (1991). The technology of personal violence. Crime and Justice: A Review of Research Vol. 14. M. Tonry. Chicago, University of Chicago Press. **14:** 1-17.

Cook, P. J. and J. Blose (1981). "State programs for screening handgun buyers." The Annals of the American Academy of Political and Social Science **445**: 80-91.

Cook, P. J. and J. Ludwig (1996). Guns in America: results of a comprehensive national survey on firearms ownership and use. Washington, The Police Foundation.

Cook, P. J. and J. A. Ludwig (2000). Gun violence: the real costs. New York, Oxford University Press.

Cook, P. J., S. Molliconi, et al. (1995). "Regulating gun markets." Journal of Criminal Law and Criminology **86**: 59-92.

Cox, D. R. (1972). "Regression models and life tables." J Roy Stat Soc **B34**: 187-220.

Farrington, D. P. (1987). Predicting individual crime rates. Prediction and classification: criminal justice decision making. D. M. Gottfredson and M. Tonry. Chicago, University of Chicago.

Federal Bureau of Investigation (1996). Crime in the United States 1995. Washington, Federal Bureau of Investigation.

Federal Bureau of Investigation (2000). National instant criminal background check system (NICS): operations report (November 30, 1998-December 31, 1999). Washington, Federal Bureau of Investigation.

Federal Bureau of Investigation (2001). Crime in the United States, 2000. Washington, Federal Bureau of Investigation.

Frome, E. and H. Checkoway (1985). "Use of Poisson regression models in estimating incidence rates and ratios." American Journal of Epidemiology **124**: 309-23.

General Accounting Office (2000). Implementation of the national instant criminal background check system. Washington, General Accounting Office.

Greenberg, D. F. (1991). "Modeling criminal careers." Criminology **29**: 17-26.

Hosmer, D. W. and S. Lemeshow (1999). Applied survival analysis. New York, John Wiley & Sons.

Jacobs, J. B. and K. A. Potter (1995). "Keeping guns out of the "wrong" hands: the Brady Law and the limits of regulation." Journal of Criminal Law and Criminology **86**: 93-120.

Johns Hopkins Center for Gun Policy and Research and National Opinion Research Center (1997). Summary of the findings: 1996 National Gun Policy Survey. Baltimore, Johns Hopkins Center for Gun Policy and Research.

Kaplan, E. L. and P. Meier (1958). "Nonparametric estimation from incomplete observations." Journal of the American Statistical Association **53**: 457-481.

Kelly, P. J. and L. L.-Y. Lim (2000). "Survival analyses for recurrent event data: an application to childhood infectious diseases." Statistics in Medicine **19**: 13-33.

Kleck, G. (1997A). Methods to improve Brady, with positive potential for law enforcement. 1997 annual meeting of the Homicide Research Working Group.

Kleck, G. (1997B). Targeting guns: firearms and their control. New York, Aldine de Gruyter.

Kleinbaum, D., L. Kupper, et al. (1982). Epidemiologic research: principals and quantitative methods. Belmont, Lifetime Learning Publications.

Loftin, C., D. McDowall, et al. (1991). "Effects of restrictive licensing on handguns on homicide and suicide in the District of Columbia." New England Journal of Medicine **325**: 1615-1620.

Lott, J. R. and D. B. Mustard (1997). "Crime, deterrence, and right-to-carry concealed handguns." Journal of Legal Studies **26**: 1-68.

Ludwig, J. (1998). "Concealed-gun-carrying laws and violent crime: evidence from state panel data." International Review of Law and Economics **18**: 239-254.

Ludwig, J. A. and P. J. Cook (2000). "Homicide and suicide rates associated with implementation of the Brady Handgun Violence Prevention Act." Journal of the American Medical Association **284**: 585-591.

Maltz, M. (1984). Recidivism. Orlando, Academic Press.

Marvell, T. B. and C. Moody (1995). "The impact of enhanced prison terms for felonies committed with guns." Criminology **33**: 247-281.

Marvell, T. B. and C. Moody (2001). "The lethal effects of three-strikes laws." The Journal of Legal Studies **30**: 89.

Max, W. and D. P. Rice (1993). "Shooting in the dark: estimating the cost of firearm injuries." Health Affairs **12**(4): 171-185.

McDowall, D., C. Loftin, et al. (1992). "A comparative study of the preventive effects of mandatory sentencing laws for gun crimes." Journal of Criminal Law and Criminology **83**: 378-394.

McDowall, D., C. Loftin, et al. (1995). "Easing concealed firearm laws: effects on homicide in three states." Journal of Criminal Law and Criminology **86**: 193-206.

Office of Juvenile Justice and Delinquency Prevention (1999). Promising strategies to reduce gun violence. Washington, Office of Juvenile Justice and Delinquency Prevention.

Office of Technology Assessment (1991). Automated records checks of firearm purchasers: issues and options. Washington, Government Printing Office.

Orsagh, T. (1989). A survey of 20 state criminal history repositories. Submitted to the task force on felon identification in firearm sales, US Department of Justice. Chapel Hill, Fisher-Orsagh Associates.

Perkins, C., P. Klaus, et al. (1996). Criminal victimization in the United States, 1993. Washington, Bureau of Justice Statistics.

Prentice, R. L., J. Williams, et al. (1981). "On the regression analysis of multivariate failure time data." Biometrika **68**: 373-379.

Rand, M. R. (1990). Handgun crime victims. Washington, Bureau of Justice Statistics.

Rand, M. R. (1995). The effects of offender weapon use and victim self-defense on robbery outcomes. Washington, Bureau of Justice Statistics.

Regional Justice Information Service (2000). Survey of state procedures related to firearm sales, midyear 1999. Washington, Bureau of Justice Statistics.

Regional Justice Information Service (2001). Survey of state procedures related to firearm sales, midyear 2000. Washington, Bureau of Justice Statistics.

Rennison, C. M. (2001). Criminal victimization 2000: changes 1999-2000 with trends 1993-2000. Washington, Bureau of Justice Statistics.

Roth, J. A. and C. S. Koper (1997). Impact evaluation of the public safety and recreational firearms use protection act of 1994. Washington, The Urban Institute.

Roth, J. A. and C. S. Koper (1999). Impacts of the 1994 assault weapons ban: 1994-1996. Washington, National Institute of Justice.

Sherman, L. W., J. W. Shaw, et al. (1995). The Kansas City gun experiment. Washington, National Institute of Justice.

Simon, T., J. A. Mercy, et al. (2001). Injuries from violent crime, 1992-98. Washington, Bureau of Justice Statistics/Centers for Disease Control and Prevention.

Sloan, J., A. L. Kellermann, et al. (1988). "Handgun regulation, crimes, assaults, homicide. A tale of two cities." New England Journal of Medicine **319**: 1256-62.

Teret, S. P., G. R. Alexander, et al. (1990). "The passage of Maryland's gun law: data and advocacy for injury prevention." Journal fo the Public Health Policy **11**: 26-38.

Tien, J. M. and T. F. Rich (1990). Identifying persons, other than felons, ineligible to purchase firearms; a feasibility study. Washington, Bureau of Justice Statistics.

Tillman, R. (1987). "The size of the "criminal population:" the prevalence and incidence of adult arrest." Criminology **25**: 561-579.

Tittle, C. and R. Meier (1990). "Specifying the SES-delinquency relationship." Criminology **28**: 271-299.

Tracy, P. E., M. E. Wolfgang, et al. (1990). Delinquency careers in two birth cohorts. New York, Plenum Press.

Vernick, J. S., D. W. Webster, et al. (1998). Evaluation of Maryland's 1989 law banning Saturday night special handguns: intermediate outcome measures. 1998 Annual Meeting of the American Public Health Association, Washington, DC.

Visher, C. A., P. K. Lattimore, et al. (1991). "Predicting the recidivism of serious youthful offenders using survival methods." Criminology **29**: 329-366.

Webster, D. W. (1997). Methodological considerations in evaluating the effects of the Brady Act. 1997 annual meeting of the Homicide Research Working Group.

Webster, D. W., J. S. Vernick, et al. (1998). Evaluation of Maryland's law banning Saturday night specials: effects on violent crimes. 1998 Annual Meeting of the American Public Health Association, Washington, DC.

Weil, D. S. and R. C. Knox (1996). "Effects of limiting handgun purchase on interstate transfer of firearms." Journal of the American Medical Association **275**: 1759-1761.

Wintemute, G. J. (2000A). The effectiveness of local ordinances banning the sale of "Saturday night special" handguns: a preliminary study. Sacramento, Violence Prevention Research Program.

Wintemute, G. J. (2000B). Guns and gun violence. The Crime Drop in America. A. Blumstein and J. Wallman. New York, Cambridge University Press: 45-96.

Wintemute, G. J. (2000C). "Impact of the Brady Act on homicide and suicide rates. (Letter)." Journal of the American Medical Association **284**: 2719-2720.

Wintemute, G. J., C. M. Drake, et al. (1998). "Prior misdemeanor convictions as a risk factor for later violent and firearm-related criminal activity among authorized purchasers of handguns." Journal of the American Medical Association **280**: 2083-2087.

Wintemute, G. J. and M. A. Wright (1992). "Initial and subsequent hospital costs of firearm injuries." The Journal of Trauma **33**: 556-560.

Wright, M. A., G. J. Wintemute, et al. (1999). "Effectiveness of denial of handgun purchase to persons believed to be at high risk for firearm violence." American Journal of Public Health **89**: 88-90.

Table 1: Violent Misdemeanors That Became Grounds for Denial of Firearm Purchase in California in 1991

- Possession of a deadly weapon with the intent to intimidate a witness. (Penal Code, § 136.5.)
- Threatening witnesses, victims, or informants while committing another misdemeanor. (Penal Code, § 140.)
- Unauthorized possession of a weapon in a courtroom, courthouse or court building, or at a public meeting. (Penal Code, § 171 (b).)
- Bringing into or possessing a loaded firearm within the state capitol, legislative offices, etc. (Penal Code, § 171 (c).)
- Taking into or possessing loaded firearms within the governor's mansion or residence or other constitutional officer, etc. (Penal Code, § 171 (d).)
- Assault. (Penal Code, § 241.)
- Battery. (Penal Code, § 243.)
- Assault with a stun gun or taser weapon. (Penal Code, § 244.5.)
- Assault with a deadly weapon or instrument, by any means likely to produce great bodily injury or with a stun gun or taser on a school employee engaged in performance of duties. (Penal Code, § 245.5.)
- Discharging a firearm in a grossly negligent manner. (Penal Code, § 246.3.)
- Shooting at an unoccupied aircraft, motor vehicle, or uninhabited building or dwelling house. (Penal Code, § 247.)
- Drawing, exhibiting, or using any deadly weapon other than a firearm. (Penal Code, § 417(a)(1).)
- Drawing or exhibiting, selling, manufacturing, or distributing firearm replicas or imitations. (Penal Code, § 417.2.)
- Bringing into or possessing firearms upon or within public schools and grounds. (Penal Code, § 626.9.)
- Driver of any vehicle who knowingly permits another person to discharge a firearm from the vehicle or any person who willfully and maliciously discharges a firearm from a motor vehicle. (Penal Code, § 12034(b)(d).)
- Person or corporation who sells any concealable firearm to any minor. (Penal Code, § 12100 (a).)
- Possession of ammunition designed to penetrate metal or armor. (Penal Code, § 12320.)
- Carrying a concealed or loaded firearm or other deadly weapon or wearing a peace officer uniform while picketing. (Penal Code, § 12590.)

Source: California Firearms Laws 1991. Sacramento: California Department of Justice, 1991.

Table 2: Demographic and Prior Criminal History Characteristics of Violent Misdemeanants Who Applied to Purchase Handguns in California*

Characteristic	Purchase Denied, 1991 (n= 986)	Purchase Approved, 1989-1990 (n= 787)
Sex, n (%)		
Male	945 (95.8)	757 (96.2)
Female	41 (4.2)	30 (3.8)
Age, n (%)		
21-24	234 (23.7)	172 (21.9)
25-29	411 (41.7)	360 (45.7)
30-34	341 (34.6)	255 (32.4)
Race/Ethnicity, n (%)		
White	455 (46.1)	370 (47.0)
Black	157 (15.9)	99 (12.6)
Hispanic	296 (30.0)	228 (29.0)
Asian/Other	48 (4.9)	35 (4.4)
Missing/Unknown	30 (3.0)	55 (7.0)
Number of Prior Convictions†		
Any Crime, n (%)		
1	504 (51.7)	382 (48.5)
2	253 (26.0)	196 (24.9)
3	102 (10.5)	111 (14.1)
4+	115 (11.8)	98 (12.5)

Characteristic	Purchase Denied, 1991 (n= 986)	Purchase Approved, 1989-1990 (n= 787)
Gun and/or Violent Crime, n (%)		
1	737 (76.4)	573 (72.8)
2	163 (16.9)	161 (20.5)
3+	65 (6.7)	53 (6.7)

* Percentages may not add to 100.0 due to rounding.

† Because records were incomplete, the number of convictions for any crime was unknown for 12 denied persons, and the number of convictions for gun or violent crimes was unknown for 21 denied persons. Percentages are of subjects for whom the number of convictions was known.

Table 3. Incidence and Crude Relative Hazard of First Arrest for New Crimes among Violent Misdemeanants Who Applied to Purchase Handguns*

Characteristic	Subjects	Any Crime			Gun and/or Violent Crime			Non-Gun, Non-Violent Crime		
		Number (%) Arrested	Events per 100 py	Crude RH (95% CI)	Number (%) Arrested	Events per 100 py	Crude RH (95% CI)	Number (%) Arrested	Events per 100 py	Crude RH (95% CI)
All Subjects	1,654	546 (33.0)	14.7		360 (21.8)	8.8		366 (22.1)	9.0	
Purchase Status										
Denied	927	296 (31.9)	14.1	1	186 (20.1)	8.0	1	211 (22.8)	9.3	1
Approved	727	250 (34.4)	15.5	1.10 (0.93-1.30)	174 (23.9)	9.9	1.23 (1.00-1.52)	155 (21.3)	8.6	0.93 (0.75-1.14)
Sex										
Female	65	21 (32.3)	14.3	1	11 (16.9)	6.6	1	15 (23.1)	9.5	1
Male	1,589	525 (33.0)	14.7	1.02 (0.66-1.58)	349 (22.0)	8.9	1.34 (0.74-2.45)	351 (22.1)	9.0	0.94 (0.56-1.58)
Age										
21-24	377	163 (43.2)	21.0	1	108 (28.6)	12.3	1	117 (31.0)	13.3	1
25-29	719	234 (32.5)	14.4	0.70 (0.57-0.85)	152 (21.1)	8.5	0.70 (0.55-0.89)	152 (21.1)	8.6	0.65 (0.51-0.83)
30-34	558	149 (26.7)	11.3	0.55 (0.44-0.69)	100 (17.9)	7.1	0.58 (0.44-0.76)	97 (17.4)	6.8	0.52 (0.40-0.68)

Characteristic	Subjects	Any Crime			Gun and/or Violent Crime			Non-Gun, Non-Violent Crime		
		Number (%) Arrested	Events per 100 py	Crude RH (95% CI)	Number (%) Arrested	Events per 100 py	Crude RH (95% CI)	Number (%) Arrested	Events per 100 py	Crude RH (95% CI)
Prior Convictions										
Any Crime										
1	815	209 (25.6)	10.8	1	144 (17.7)	7.0	1	126 (15.5)	6.0	1
2	429	147 (34.3)	15.2	1.40 (1.14-1.73)	90 (21.0)	8.4	1.19 (0.92-1.55)	104 (24.2)	9.9	1.65 (1.27-2.14)
3	200	87 (43.5)	21.0	1.90 (1.48-2.44)	57 (28.5)	12.1	1.70 (1.25-2.31)	58 (29.0)	12.2	2.01 (1.47-2.75)
4+	198	95 (48.0)	25.4	2.26 (1.77-2.88)	63 (31.8)	14.1	1.97 (1.47-2.65)	73 (36.9)	17.2	2.79 (2.09-3.73)
Gun and/or Violent Crime										
1	1,217	359 (29.5)	12.7	1	230 (18.9)	7.5	1	241 (19.8)	7.9	1
2	302	123 (40.7)	19.6	1.50 (1.23-1.85)	86 (28.5)	12.3	1.60 (1.25-2.05)	81 (26.8)	11.4	1.43 (1.11-1.84)
3+	115	53 (46.1)	23.9	1.81 (1.36-2.42)	37 (32.2)	14.1	1.84 (1.30-2.60)	36 (31.3)	14.0	1.74 (1.23-2.47)

* Limited to subjects for whom follow-up independent of new criminal activity was available. Subjects were excluded when number of prior convictions was not precisely known (n=12 for any convictions, n=20 for gun and/or violent convictions).

PY denotes person-years; RH, relative hazard; CI, confidence interval.

Table 4. Adjusted Relative Hazard of First Arrest for New Crimes among Violent Misdemeanants Who Applied to Purchase Handguns*

Characteristic	Any Crime	Gun and/or Violent Crime	Non-Gun, Non-Violent Crime
	Adjusted RH (95% CI)	Adjusted RH (95% CI)	Adjusted RH (95% CI)
Purchase status			
Denied	1	1	1
Approved	1.15 (0.97-1.37)	1.29 (1.04-1.60)	0.96 (0.78-1.19)
Age			
21-24	1	1	1
25-29	0.70 (0.57-0.86)	0.70 (0.54-0.90)	0.64 (0.50-0.82)
30-34	0.46 (0.37-0.59)	0.48 (0.36-0.64)	0.44 (0.33-0.59)
Prior Convictions			
Any Crime			
1	1	1	1
2	1.36 (1.08-1.72)	1.01 (0.74-1.37)	1.71 (1.29-2.27)
3	1.99 (1.47-2.69)	1.52 (1.04-2.23)	2.47 (1.72-3.54)
4+	2.40 (1.76-3.28)	1.77 (1.19-2.63)	3.47 (2.43-4.96)
Gun and/or Violent Crime			
1	1	1	1
2	1.06 (0.82-1.36)	1.39 (1.01-1.91)	0.85 (0.64-1.15)
3+	1.04 (0.73-1.49)	1.28 (0.82-2.00)	0.84 (0.55-1.28)

* Limited to subjects for whom follow-up independent of new criminal activity was available. Subjects were excluded when number of prior convictions was not precisely known (n=12 for any convictions, n=20 for gun and/or violent convictions). Relative hazards are adjusted for sex and all variables in the table. RH denotes relative hazard; CI, confidence interval.

Table 5. Adjusted Relative Hazard of First Arrest for New Crimes, for Handgun Purchasers as Compared to Denied Persons, among Violent Misdemeanants Who Applied to Purchase Handguns*

Characteristic	Any Crime			Gun and/or Violent Crime			Non-Gun, Non-Violent Crime		
	Events per 100 py		Adjusted RH (95% CI)	Events per 100 py		Adjusted RH (95% CI)	Events per 100 py		Adjusted RH (95% CI)
	Purchase Approved	Purchase Denied		Purchase Approved	Purchase Denied		Purchase Approved	Purchase Denied	
Age									
21-24	22.1	20.2	1.13 (0.82-1.56)	14.4	10.9	1.37 (0.92-2.03)	12.8	13.6	1.02 (0.69-1.50)
25-29	14.2	14.7	1.04 (0.80-1.36)	8.5	8.6	1.06 (0.76-1.48)	8.0	9.1	0.93 (0.67-1.29)
30-34	13.4	9.8	1.38 (0.98-1.94)	9.1	5.7	1.64 (1.07-2.51)	6.6	6.9	0.96 (0.63-1.46)
Prior Convictions									
Any Crime									
1	11.6	10.1	1.20 (0.91-1.60)	7.8	6.4	1.26 (0.89-1.78)	5.6	6.3	0.97 (0.67-1.39)
2	15.2	15.2	0.98 (0.70-1.37)	9.4	7.7	1.18 (0.77-1.83)	9.1	10.6	0.85 (0.57-1.28)
3	23.1	19.0	1.27 (0.82-1.96)	12.2	11.9	1.12 (0.65-1.93)	13.5	11.1	1.33 (0.79-2.25)
4+	27.2	24.0	1.27 (0.83-1.96)	18.8	10.9	1.80 (1.05-3.09)	15.6	18.6	0.90 (0.55-1.47)

Characteristic	Any Crime			Gun and/or Violent Crime			Non-Gun, Non-Violent Crime		
	Events per 100 py		Adjusted RH (95% CI)	Events per 100 py		Adjusted RH (95% CI)	Events per 100 py		Adjusted RH (95% CI)
	Purchase Approved	Purchase Denied		Purchase Approved	Purchase Denied		Purchase Approved	Purchase Denied	
Gun and/or Violent Crime									
1	13.6	12.0	1.18 (0.95-1.47)	8.7	6.6	1.38 (1.05-1.81)	7.4	8.2	0.97 (0.74-1.26)
2	20.8	18.5	1.15 (0.80-1.65)	13.6	11.1	1.29 (0.84-2.00)	11.9	11.0	1.12 (0.72-1.75)
3+	22.8	24.9	1.24 (0.70-2.21)	12.9	15.1	0.93 (0.47-1.84)	11.6	16.2	0.84 (0.42-1.68)

- Limited to subjects for whom follow-up independent of new criminal activity was available. Subjects were excluded when number of prior convictions was not precisely known (n=12 for any convictions, n=20 for gun and/or violent convictions). Relative hazards are adjusted for sex and all variables in the table. PY denotes person-years; RH, relative hazard; CI, confidence interval.

Figure 1A. Kaplan–Meier Event Curves for New Arrests for Gun and/or Violent Crimes, by Whether a Handgun Purchase Was Approved or Denied

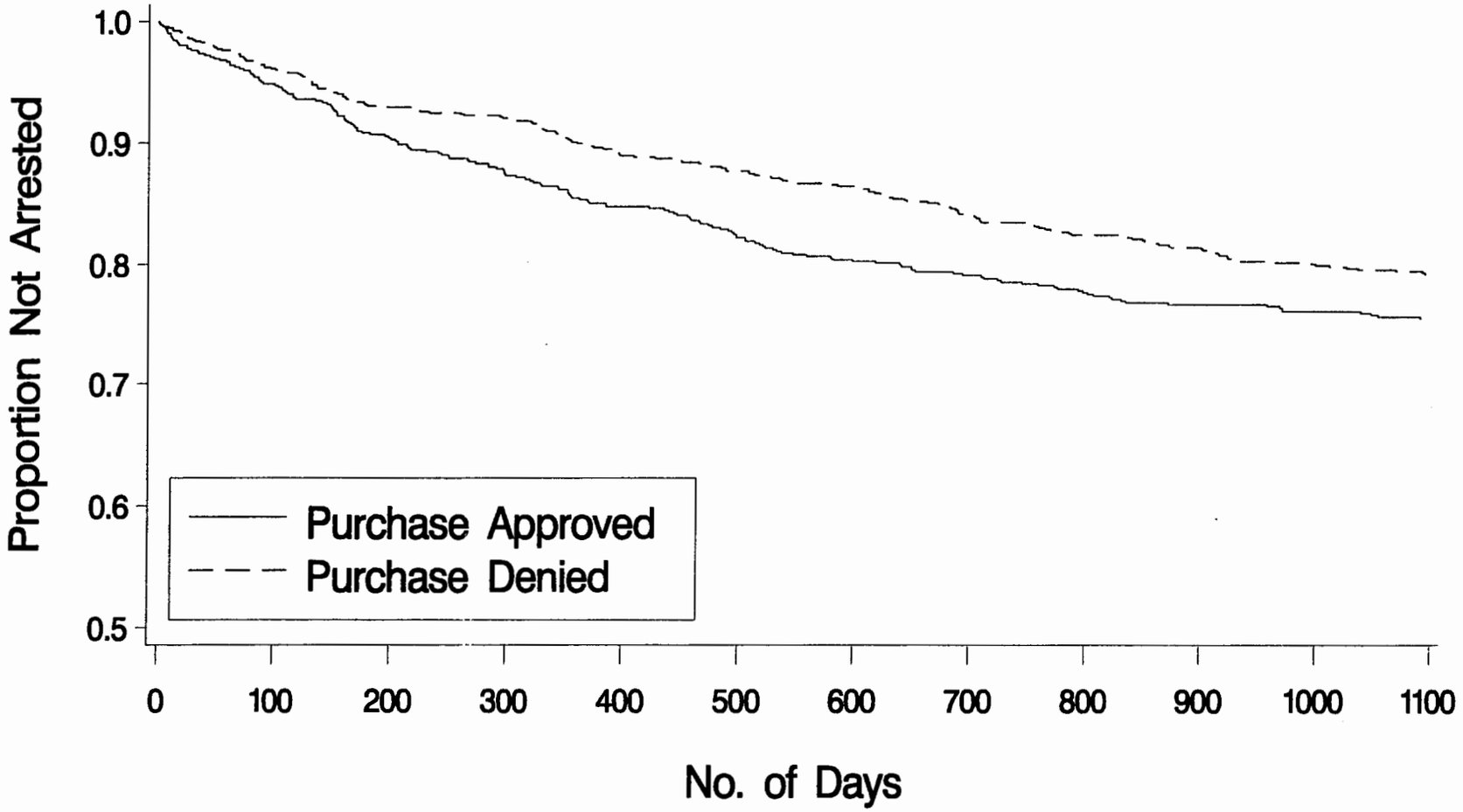


Figure 1B. Kaplan–Meier Event Curves for New Arrests for Nongun, Nonviolent Crimes, by Whether a Handgun Purchase Was Approved or Denied

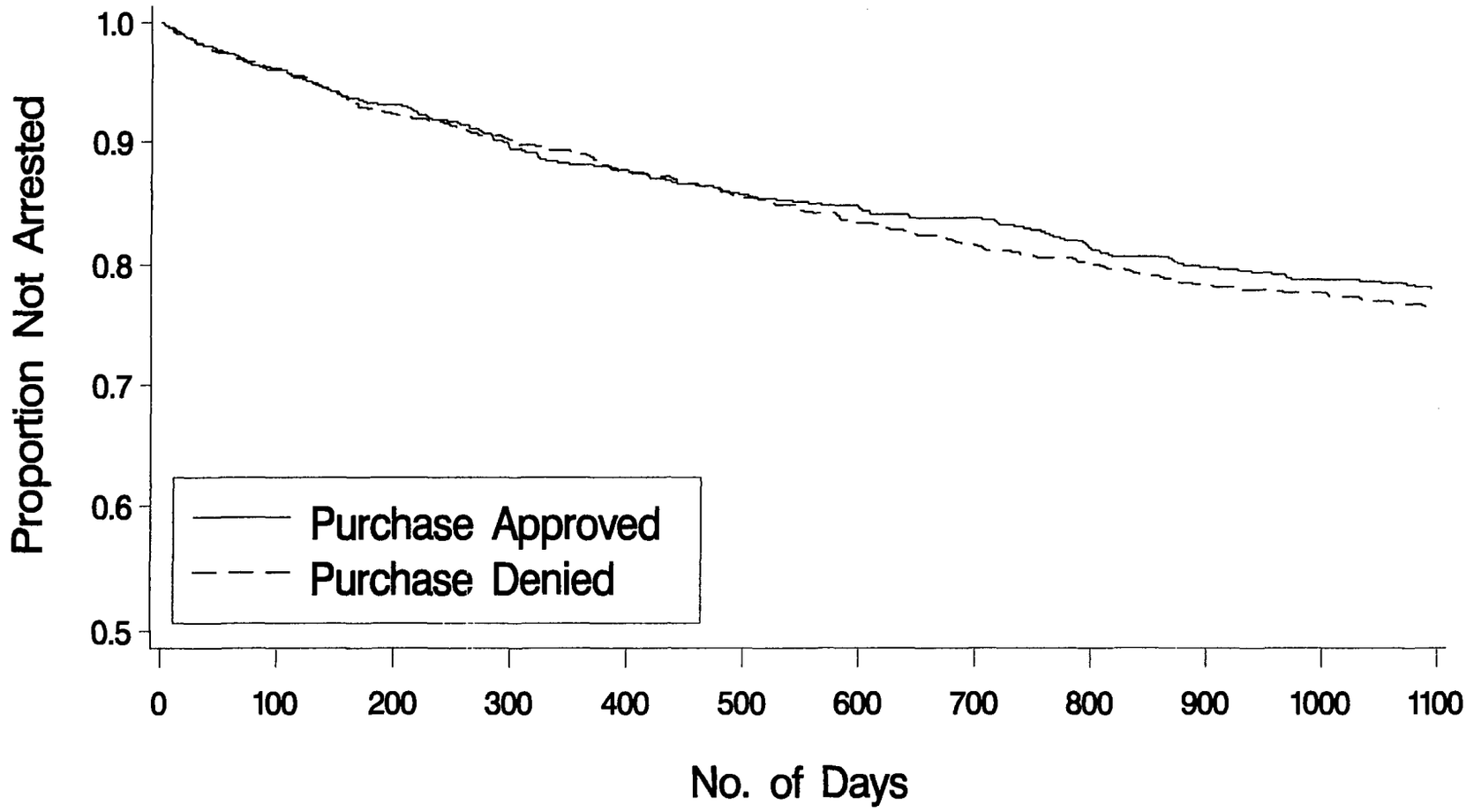


Figure 2A. Kaplan–Meier Event Curves for New Arrests for Gun and/or Violent Crimes Among Approved Handgun Purchasers, by Age

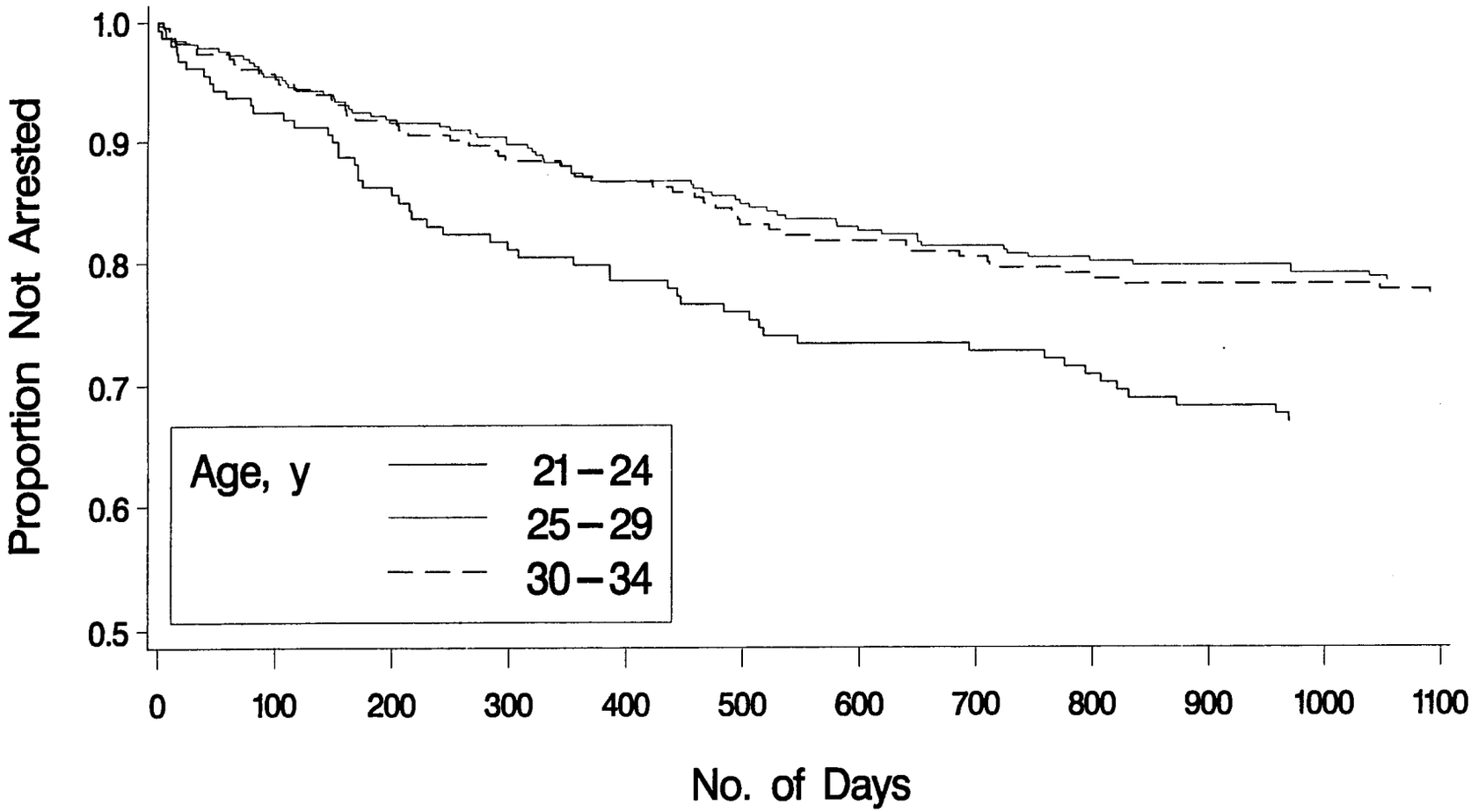


Figure 2B. Kaplan–Meier Event Curves for New Arrests for Gun and/or Violent Crimes Among Denied Handgun Purchasers, by Age

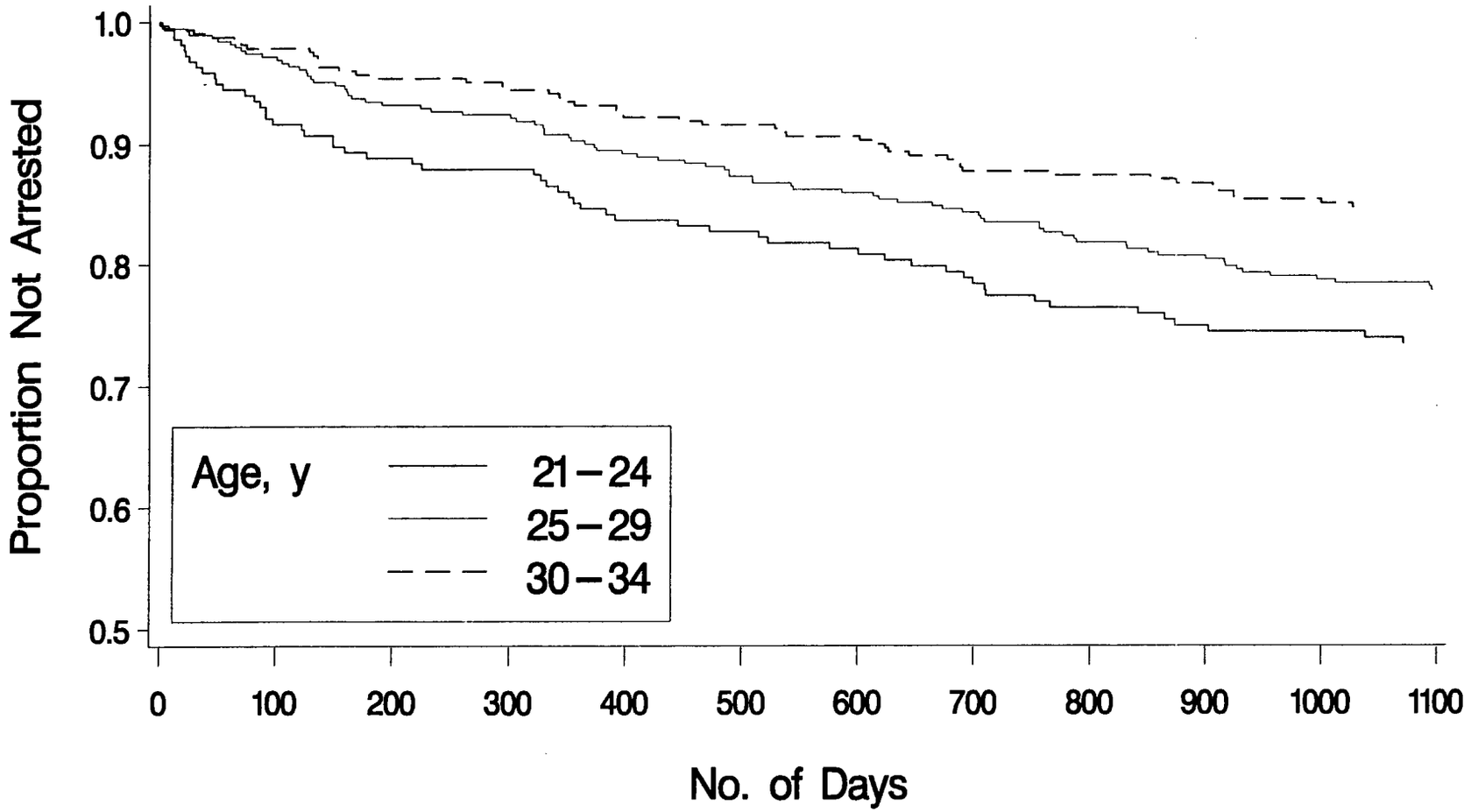


Figure 3A. Kaplan–Meier Event Curves for New Arrests for Gun and/or Violent Crimes, Among Approved Handgun Purchasers, by Number of Prior Convictions for Any Crime

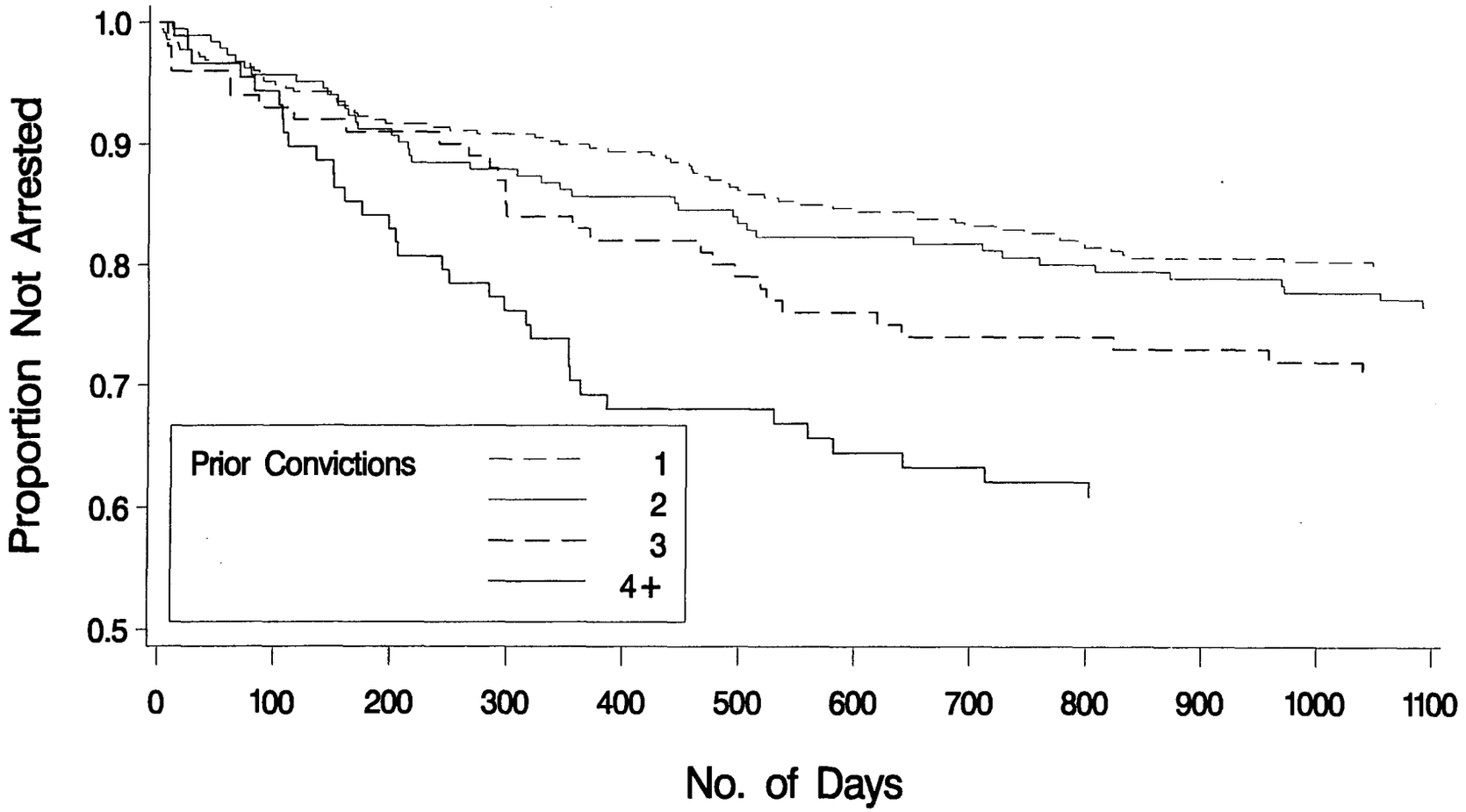
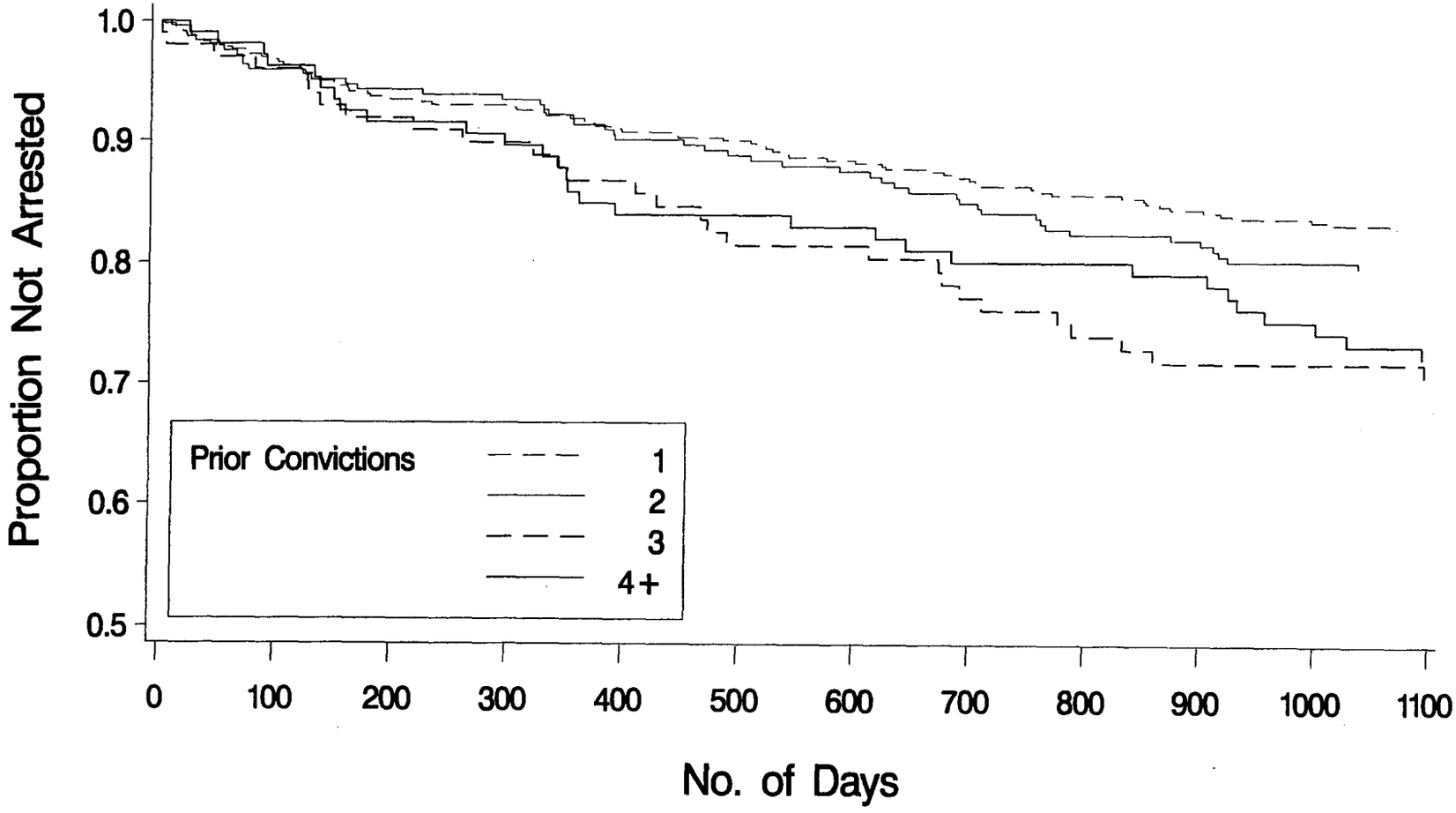


Figure 3B. Kaplan–Meier Event Curves for New Arrests for Gun and/or Violent Crimes, Among Denied Handgun Purchasers, by Number of Prior Convictions for Any Crime



ATTACHMENT B

Risk Factors for Femicide in Abusive Relationships: Results From a Multisite Case Control Study

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Objectives. This 11-city study sought to identify risk factors for femicide in abusive relationships.

Methods. Proxies of 220 intimate partner femicide victims identified from police or medical examiner records were interviewed, along with 343 abused control women.

Results. Preincident risk factors associated in multivariate analyses with increased risk of intimate partner femicide included perpetrator's access to a gun and previous threat with a weapon, perpetrator's stepchild in the home, and estrangement, especially from a controlling partner. Never living together and prior domestic violence arrest were associated with lowered risks. Significant incident factors included the victim having left for another partner and the perpetrator's use of a gun. Other significant bivariate-level risks included stalking, forced sex, and abuse during pregnancy.

Conclusions. There are identifiable risk factors for intimate partner femicides. (*Am J Public Health.* 2003;93:1089–1097)

Femicide, the homicide of women, is the leading cause of death in the United States among young African American women aged 15 to 45 years and the seventh leading cause of premature death among women overall.[1] American women are killed by intimate partners (husbands, lovers, ex-husbands, or ex-lovers) more often than by any other type of perpetrator.[2–4] Intimate partner homicide accounts for approximately 40% to 50% of US femicides but a relatively small proportion of male homicides (5.9%).[1,5–10] The percentage of intimate partner homicides involving male victims decreased between 1976 and 1996, whereas the percentage of female victims increased, from 54% to 72%.[4]

The majority (67%–80%) of intimate partner homicides involve physical abuse of the female by the male before the murder, no matter which partner is killed.[1,2,6,11–13] Therefore, one of the major ways to decrease intimate partner homicide is to identify and intervene with battered women at risk. The objective of this study was to specify the risk factors for intimate partner femicide among women in violent relationships with the aim of preventing this form of mortality.

METHODS

An 11-city case–control design was used; femicide victims were cases (n=220), and randomly identified abused women residing in the same metropolitan area were control women (n=343). Co-investigators at each site collaborated with domestic violence advocacy, law enforcement, and medical examiner offices in implementing the study. Sampling quotas for cases and control women in each city were proportionately calculated so that the cities with the highest annual femicide rates included the largest number of cases and control women.

Femicide Cases

All consecutive femicide police or medical examiner records from 1994 through 2000 at each site were examined to assess victim–perpetrator relationships. Cases were eligible if the perpetrator was a current or former intimate partner and the case was designated as "closed" by the police (suicide by the perpetrator, arrest, or adjudication, depending on the jurisdiction). Records were abstracted for data specific to the homicide.

At least 2 potential proxy informants, individuals knowledgeable about the victim's relationship with the perpetrator, were identified from the records. The proxy who, in the investigator's judgment, was the most knowledgeable source was then sent a letter explaining the study and including researcher contact information. If no communication was initiated by the proxy, study personnel attempted telephone or (in the few cases in which no telephone contact was possible) personal contact.

If the first proxy was not knowledgeable about details of the relationship, she or he was asked to identify another willing potential proxy informant. When a knowledgeable proxy was found, informed consent was obtained. In 373 of the 545 (68%) total femicide cases abstracted, a knowledgeable proxy was identified and located. In 82% (307/373) of these cases, proxies agreed to participate. Two exclusion criteria, age (18–50 years) and no previous abuse by the femicide perpetrator, resulted in the elimination of 87 additional cases (28.3% of 307 cases), with 59 (19.2% of 307 cases) eliminated solely as a result of the latter criterion.

Researchers and doctoral students experienced in working with victims of domestic violence conducted telephone or in-person interviews in English or Spanish; interviews were 60 to 90 minutes in duration. Both proxies and abused control women were excluded if they could speak neither English nor Spanish.

Abused Control Women

Stratified random-digit dialing (up to 6 attempts per number) was used to select women aged 18 to 50 years who had been involved "romantically or sexually" in a relationship at some time in the past 2 years in the same cities in which the femicides occurred. A woman was considered "abused" if she had been physically assaulted or threatened with a weapon by a current or former intimate partner during the past 2 years; we

identified episodes of abuse with a modified version of the Conflict Tactics Scale with stalking items added.[11,14]

English- and Spanish-speaking telephone interviewers employed by an experienced telephone survey firm completed sensitivity and safety protocol training.[15] A total of 4746 women met the age and relationship criteria and were read the consent statement. Among these women, 3637 (76.6%) agreed to participate, 356 (9.8%) of whom had been physically abused or threatened with a weapon by a current or recent intimate partner. Thirteen abused control women were excluded from the analysis because they reported that the injuries from their most severe incident of abuse were so severe that they thought they could have died.

Risk Factor Survey Instrument

The interview included previously tested instruments, such as the Danger Assessment,[16,17] and gathered information on demographic and relationship characteristics, including type, frequency, and severity of violence, psychological abuse, and harassment; alcohol and drug use; and weapon availability. The Danger Assessment had been translated to and validated in Spanish in earlier research; the remainder of the survey was translated and back-translated by our Spanish-speaking interviewers and by project staff in Houston, Los Angeles, and New York. A factor analysis of the risk items was used in constructing scales measuring partners' controlling and stalking behaviors. Each scale was internally consistent (α=.83 and .75, respectively).

Data Analysis

Logistic regression was used to estimate the independent associations between each of the hypothesized risk factors and the risk of intimate partner femicide. Because the importance of certain risk factors may not be detected when their effects are mediated by more proximal risk factors, we sequentially added blocks of conceptually similar explanatory variables along a risk factor continuum ranging from most distal (demographic characteristics of perpetrators and victims) to most proximal (e.g., weapon used in the femicide or most serious abuse incident). Variables not significantly associated with femicide risk were dropped from subsequent models. Model coefficients were exponentiated so that they could be interpreted as adjusted odds ratios (ORs).

RESULTS

Demographic, background, and relationship variables that differentiated case women from control women in bivariate analyses are presented in Tables 1 and 2. Table 3 displays findings from the series of logistic regression models. The strongest sociodemographic risk factor (model 1) for intimate partner femicide was the abuser's lack of employment (adjusted OR=5.09; 95% confidence interval [CI]=2.74, 9.45). Instances in which the abuser had a college education (vs a high school education) were protective against femicide (adjusted OR=0.31; 95% CI=0.12, 0.80), as were instances in which the abuser had a college degree and was unemployed but looking for work. Race/ethnicity of abusers and victims was not independently associated with intimate partner femicide risk after control for other demographic factors.

When additional individual-level risk factors for homicide were added to the model (model 2), both abuser's access to a firearm (adjusted OR=7.59; 95% CI=3.85, 14.99) and abuser's use of illicit drugs (adjusted OR=4.76; 95% CI=2.19, 10.34) were strongly associated with intimate partner femicide, although the abuser's excessive use of alcohol was not. Although the abuser's access to a firearm increased femicide risk, victims' risk of being killed by their intimate partner was lower when they lived apart from the abuser and had sole access to a firearm (adjusted OR=0.22). Neither alcohol abuse nor drug use by the victim was independently associated with her risk of being killed.

Relationship variables were added in model 3. Never having lived with the abusive partner significantly lowered women's risk of femicide (OR=0.39; 95% CI=0.16, 0.97). Having been separated from an abusive partner after living together was associated with a higher risk of femicide (adjusted OR=3.64; 95% CI=1.71, 7.78), as was having ever left or having asked the partner to leave (adjusted OR=3.19; 95% CI=1.70, 6.02). Having a child living in the home who was not the abusive partner's biological child more than doubled the risk of femicide (adjusted OR=2.23; 95% CI=1.13, 4.39). Addition of the relationship variables resulted in victims' sole access to a firearm no longer being statistically significant and substantially reduced the effects of abuser's drug use.

Variables related to abusive partners' controlling behaviors and verbal aggression were added in model 4. The effects of a highly controlling abuser were modified by whether the abuser and victim separated after living together. The risk of intimate partner femicide was increased 9-fold by the combination of a highly controlling abuser and the couple's separation after living together (adjusted OR=8.98; 95% CI=3.25, 24.83). Femicide risk was increased to a lesser degree when the abuser was highly controlling but the couple had not separated (adjusted OR=2.90; 95% CI=1.41, 5.97) and when the couple had separated after living together but the abuser was not highly controlling (adjusted OR=3.10; 95% CI=1.20, 8.05).

Threatening behaviors and stalking were added in model 5. Abusers' previous threats with a weapon (adjusted OR=4.08; 95% CI=1.91, 8.72) and threats to kill (adjusted OR=2.60; 95% CI=1.24, 5.42) were associated with substantially higher risks for femicide. After control for threatening behaviors, there were no significant independent effects of abusers' drug use (OR=1.64; 95% CI=0.88, 3.04). The effects of high control with separation (adjusted OR=4.07; 95% CI=1.33, 12.4) and access to guns (adjusted OR=5.44; 95% CI=2.89, 10.22), although substantially reduced, remained strong.

Stalking and threats to harm children and other family members were not independently associated with intimate partner femicide risk after variables had been entered in the first models. When variables related to previous physical abuse were included in model 6, previous arrest of the abuser for domestic violence was associated with a decreased risk of intimate partner femicide (adjusted OR=0.34; 95% CI=0.16, 0.73). The association between abusers' use of forced sex on victims and increased intimate partner femicide risks approached statistical significance (adjusted OR=1.87; 95% CI=0.97, 3.63; $P<.07$).

TABLE 1—Sociodemographic Characteristics of Victims and Perpetrators and General Risk Factors for Homicide, by Group

	Victims			Perpetrators		
	Nonfatal Physical Abuse (n = 343)	Homicide (n = 220)	*P*	Nonfatal Physical Abuse (n = 343)	Homicide (n = 220)	*P*
Sociodemographic variables						
Age, y, mean ± SD	30.1 ± 8.6	31.4 ± 7.7	.081	31.2 ± 9.2	34.2 ± 8.7	<.001
Don't know/refused/missing	0	0		4	22	
Race/ethnicity, No. (%)			<.001			<.001
Black/African American	70 (20.6)	104 (47.3)		83 (24.3)	107 (48.9)	
White	157 (46.3)	53 (24.1)		153 (44.7)	49 (22.4)	
Latino/Hispanic	82 (24.2)	53 (24.1)		80 (23.4)	58 (26.5)	
Other	30 (8.9)	10 (4.5)		26 (7.6)	5 (2.3)	
Don't know/refused/missing	4	0		1	1	
Education, No. (%)			<.001			<.001
Less than high school	61 (17.9)	71 (33.2)		92 (28.0)	70 (48.9)	
High school	73 (21.5)	59 (27.5)		91 (27.7)	47 (32.9)	
Some college/trade school	109 (32.1)	68 (31.8)		58 (17.7)	17 (11.9)	
College/trade school	97 (28.5)	16 (7.5)		87 (26.5)	9 (6.3)	
Don't know/refused/missing	3	6		15	77	
Employment, No. (%)			<.001			<.001
Full-time	179 (52.2)	114 (51.8)		229 (68.2)	84 (39.6)	
Part-time	70 (20.4)	31 (14.1)		39 (11.6)	20 (9.5)	
Unemployed, seeking job	40 (11.7)	12 (5.5)		25 (7.4)	13 (6.1)	
Unemployed, not seeking job	54 (15.7)	63 (28.6)		43 (12.8)	95 (44.8)	
Don't know/refused/missing	0	0		7	8	
Income (annual household), $, No. (%)			.005			
Less than 10 000	67 (21.7)	25 (18.8)				
10 000–19 999	49 (15.9)	32 (24.1)				
20 000–29 999	43 (13.9)	20 (15.0)				
30 000–39 999	41 (13.3)	29 (21.8)				
40 000 or more	109 (35.3)	27 (20.3)				
Don't know/refused/missing	34	87				
General violence/homicide risk variables						
Threatened/attempted suicide			.091			.149
Yes	33 (9.6)	12 (5.6)		68 (20.1)	45 (25.0)	
Don't know/refused/missing	0	6		4	40	
Problem alcohol drinker, No. (%)			<.001			<.001
Yes	27 (7.9)	36 (19.1)		106 (30.9)	105 (52.0)	
Don't know/refused/missing	0	32		0	18	
Illicit drug use, No. (%)			.002			<.001
Yes	49 (14.3)	48 (25.3)		101 (30.4)	123 (65.4)	
Don't know/refused/missing	1	30		11	32	
Access to a firearm,[a] No. (%)			.996			<.001
Yes	17 (5.0)	10 (5.0)		82 (23.9)	143(65.0)	
Don't know/refused/missing	2	19		0	0	

Continued

Incident-level variables were added in model 7. Abuser's use of a gun in the worst incident of abuse was associated with a 41-fold increase in risk of femicide after control for other risk factors, this effect apparently mediating the effects of abuser's access to a gun, which was no longer significant. However, previous threats with a weapon continued to be associated with increased femicide risks (OR=4.41; 95% CI=1.76, 11.06).

When the worst incident of abuse was triggered by the victim's having left the abuser for another partner or by the abuser's jealousy, there was a nearly 5-fold increase in femicide risk (adjusted OR=4.91; 95% CI=2.42, 9.96). When the incident was triggered by the victim's having left the abuser for any other reason, femicide risks were also significantly increased (adjusted OR=4.04; 95% CI=1.80, 9.06). These incident-level effects appear to mediate those related to highly controlling abusers and separation after cohabitation.

Each of the models included in Table 3 demonstrated an adequate fit according to Hosmer–Lemeshow[18] goodness-of-fit tests. Model 6 correctly predicted the case status of 73% of the cases and 93% of the control women. Model 7 correctly predicted the case status of 81% of the cases and 95% of the control women.

DISCUSSION

Seventy-nine percent (220/279) of the femicide victims aged 18 to 50 years and 70% of the 307 total femicide cases were physically abused before their deaths by the same intimate partner who killed them, in comparison with 10% of the pool of eligible control women. Thus, our first premise, that physical violence against the victim is the primary risk factor for intimate partner femicide, was upheld. The purpose of this study, however, was to determine the risk factors that, over and above previous intimate partner violence, are associated with femicide within a sample of battered women. Our analysis demonstrated that a combination of the most commonly identified risk factors for homicide, in conjunction with characteristics specific to violent intimate relationships, predicted intimate partner femicide risks.

TABLE 1—*Continued*

Arrest for violent crime, No. (%)			<.001
Yes	38 (11.5)	43 (21.8)	
Don't know/refused/missing	12	23	

Note. The referent time periods for all risk variables were the year previous to the most abusive event for abused control women and the year previous to the femicide for femicide victims.
[a]For abused women, gun access was defined as a woman's sole access to a firearm on the basis of her living apart from her partner and reporting having a gun in the home; gun access for partner was based on reports of his personal ownership of a firearm or living in a household with a firearm.

The model-building strategy we used allowed for consideration of different levels of prevention and the degree to which intimate partner femicides could be prevented by strategies directed at risk factors for homicide in general. For example, our analysis and those of others suggest that increasing employment opportunities, preventing substance abuse, and restricting abusers' access to guns can potentially reduce both overall rates of homicide and rates of intimate partner femicide.

In comparing our femicide perpetrators with other abusive men, we found that unemployment was the most important demographic risk factor for acts of intimate partner femicide. In fact, abuser's lack of employment was the only demographic risk factor that significantly predicted femicide risks after we controlled for a comprehensive list of more proximate risk factors, increasing risks 4-fold relative to the case of employed abusers (model 6). Unemployment appears to underlie increased risks often attributed to race/ethnicity, as has been found and reported in other analyses related to violence.[19,20]

The present results revealed that traits of perpetrators thought to be characteristic of violent criminals in general[21] tended to be no more characteristic of femicide perpetrators than of other batterers. For instance, in contrast to results of previous research comparing abusers and nonabusers,[22] our regression analyses showed that arrests for other crimes did not differentiate femicide perpetrators from perpetrators of intimate partner violence. After controlling for other risk factors, prior arrest for domestic violence actually decreased the risk for femicide, suggesting that arrest of abusers protects against future intimate partner femicide risks. Perpetrator drug abuse significantly increased the risk of intimate partner femicide, but only before the effects of previous threats and abuse were added. Drug abuse, therefore, was associated with patterns of intimate partner abuse that increase femicide risks.

Our iterative model-building strategy also allowed us to observe whether the effects of more proximate risk factors mediate the effects of more distal factors in a manner consistent with theory. For example, the 8-fold increase in intimate partner femicide risk associated with abusers' access to firearms attenuated to a 5-fold increase when characteristics of the abuse were considered, including previous threats with a weapon on the part of the abuser. This suggests that abusers who possess guns tend to inflict the most severe abuse.

However, consistent with other research,[3,23,15,24,25] gun availability still had substantial independent effects that increased homicide risks. As expected, these effects were due to gun-owning abusers' much greater likelihood of using a gun in the worst incident of abuse, in some cases, the actual femicide. The substantial increase in lethality associated with using a firearm was consistent with the findings of other research assessing weapon lethality. A victim's access to a gun could plausibly reduce her risk of being killed, at least if she does not live with the abuser. A small percentage (5%) of both case and control women lived apart from the abuser and owned a gun, however, and there was no clear evidence of protective effects.

Previous arrests for domestic violence was protective against intimate partner femicide in both of the final models. In most of the cities where data were collected, there is a coordinated community response to domestic violence. Under optimal conditions, such responses include adequate and swift adjudication, close supervision of parole outcomes through periodic court reviews or specialized probation programs, ongoing risk management for arrested perpetrators and ongoing safety planning for victims, and close supervision involving sanctions for batterers who drop out of mandated intervention programs.[26] Under these kinds of conditions, arrest can indeed be protective against domestic violence escalating to lethality.

Two relationship variables remained significant throughout the models. Consistent with earlier research,[27,28] instances in which a child of the victim by a previous partner was living in the home increased the risk of intimate partner femicide. Situations in which the victim and abuser had never lived together were protective, validating safety advice that battered women have offered to other battered women in interview studies.[29] Women who separated from their abusive partners after cohabitation experienced increased risk of femicide, particularly when the abuser was highly controlling. Other studies have revealed the same risks posed by estrangement,[30,31] but ours further explicates the findings by identifying highly controlling male partners as presenting the most danger in this situation. At the incident level, we found that batterers were significantly more likely to perpetrate homicide if their partner was leaving them for a different partner.

The bivariate analysis supported earlier evidence that certain characteristics of intimate partner violence are associated with intimate partner femicide, including stalking, strangulation, forced sex, abuse during pregnancy, a pattern of escalating severity and frequency of physical violence, perpetrator suicidality, perception of danger on the part of the victim, and child abuse.[15,16,20,32–37] However, these risk factors, with the exception of forced sex, were not associated with intimate partner femicide risk in the multivariate analysis. Many of these characteristics of abuse are associated with previous threats with a weapon and previous threats to kill the victim, factors that more closely predict intimate partner femicide risks.

This investigation is one of the few studies of intimate partner femicide to include a control population and, to our knowledge,

TABLE 2—Relationship Dynamics, Threatening Behavior, and Abuse Characteristics

	Abused Control Women (n = 343)	Homicide Victims (n = 220)	P
Relationship variables			
Age difference, y, mean ± SD	1.1 ± 5.7	2.9 ± 6.4	.001
Length of relationship, No. (%)			.023
1 month or less	5 (1.5)	0	
1 month to 1 year	94 (27.5)	44 (20.0)	
1 or more years	243 (71.0)	176 (80.0)	
Don't know/refused/missing	1	0	
Relationship partner, No. (%)			.005
Husband	101 (29.7)	85 (39.0)	
Boyfriend	86 (25.3)	65 (29.8)	
Ex-husband	36 (10.6)	20 (9.2)	
Ex-boyfriend	117 (34.4)	48 (22.0)	
Don't know/refused/missing	3	2	
Separated, No. (%)			<.001
Yes	117 (34.9)	101 (55.2)	
Don't know/refused/missing	8	37	
Cohabitation, No. (%)			<.001
Yes	174 (50.7)	81 (45.0)	
In the past year, but not currently	39 (11.4)	68 (37.8)	
Previously, but not in the past year	11 (3.2)	11 (6.1)	
Never	118 (34.7)	20 (11.1)	
Don't know/refused/missing	1	40	
Biological child(ren) of victim and partner living in the household, No. (%)			.034
Yes	98 (28.6)	73 (37.4)	
Don't know/refused/missing	0	25	
Biological child(ren) of victim, and not of partner, living in the household, No. (%)			<.001
Yes	60 (17.5)	82 (38.7)	
Don't know/refused/missing	0	8	
Relationship abuse dynamics			
Partner controlling behaviors (score > 3), No. (%)			<.001
Yes	84 (24.5)	145 (65.9)	
Partner called victim names to put her down, No. (%)			<.001
Yes	164 (47.8)	151 (77.8)	
Don't know/refused/missing	0	26	
General violence/homicide risk variables			
Partner violent outside home, No. (%)			<.001
Yes	116 (35.5)	102 (55.7)	
Don't know/refused/missing	16	37	
Partner threatened to kill woman, No. (%)			<.001
Yes	50 (14.6)	142 (73.6)	
Don't know/refused/missing	1	27	
Partner threatened to kill family, No. (%)			<.001
Yes	26 (7.6)	72 (33.8)	
Don't know/refused/missing	0	7	

Continued

the first to examine the connection between relationship variables and specific demographic characteristics of victims and perpetrators. Perhaps the most important limitation of the study is its necessary reliance on proxy respondents for data regarding hypothesized risk factors for intimate partner femicide cases. Because we obtained data from control women directly, rather than from a proxy, observed differences between case and control women may have been wholly or partly attributable to differences in accuracy of reporting between victims and their proxies. To examine this issue, we conducted a small pilot study comparing responses of victims of attempted femicide and responses of their proxy respondents and found good agreement between summed Danger Assessment scores from the 2 sources of information. Furthermore, there was no clear tendency for proxies to underreport or overreport victims' exposure to specific risk factors relative to the self-reports of victims themselves.[35]

It is also possible that some of the women who were excluded from this analysis because of no record of previous physical violence were in fact being abused, unknown to the proxy. However, we found fairly good correspondence with police records of previous domestic violence, and, if anything, we found more knowledge of previous physical abuse among proxies than among police. A related limitation is the relatively large proportion of "don't know" responses from proxies regarding certain hypothesized risk factors of a more personal nature (e.g., forced sex). Our decision to treat these "don't know" responses as representing absence of the "exposure" produced conservative biases in our estimates of relationships with intimate partner femicide risks. Therefore, we may have inappropriately failed to reject the null hypothesis in the case of some of these variables with large amounts of missing data and near-significant associations with intimate partner femicide risk.

Another limitation was that we excluded women who did not reside in large urban areas (other than Wichita, Kan) and control group women who did not have telephones. We also failed to keep records of exactly which proxy interviews (estimated to be less

TABLE 2—*Continued*

Partner threatened woman with a weapon, No. (%)			<.001
Yes	16 (4.7)	110 (55.3)	
Don't know/refused/missing	0	21	
Partner threatened to harm children, No. (%)			<.001
Yes	4 (1.2)	36 (18.5)	
Don't know/refused/missing	7	25	
Stalking behavior (score > 3), No. (%)			<.001
Yes	21 (6.1)	47 (21.4)	
Don't know/refused/missing	0	0	
Characteristics of physical violence			
Increase in frequency, No. (%)			<.001
Yes	88 (25.7)	109 (59.9)	
Don't know/refused/missing	5	38	
Increase in severity, No. (%)			<.001
Yes	70 (20.4)	105 (64.4)	
Don't know/refused/missing	5	57	
Partner tried to choke (strangle) woman, No. (%)			<.001
Yes	34 (9.9)	84 (56.4)	
Don't know/refused/missing	1	71	
Forced sex, No. (%)			<.001
Yes	51 (14.9)	84 (57.1)	
Don't know/refused/missing	1	73	
Abused during pregnancy (ever), No. (%)			<.001
Yes	24 (7.0)	49 (25.8)	
No or never been pregnant	319 (93.0)	141 (74.2)	
Don't know/refused/missing	0	30	
Partner arrest previously for domestic violence, No. (%)			.003
Yes	46 (13.9)	50 (25.6%)	
Don't know/refused/missing	12	25	
Incident-level variables			
Gun used, No. (%)			<.001
Yes	3 (0.9)	84 (38.2)	
Partner used alcohol or drugs, No. (%)			<.001
Yes	123 (34.6)	133 (60.5)	
Victim used alcohol or drugs, No. (%)			<.001
Yes	44 (12.4)	53 (24.1)	
Order of protection, No. (%)			<.001
Yes	16 (4.7)	54 (24.5)	
Trigger: jealousy, No. (%)			<.001
Yes	52 (17.1)	85 (38.6)	
No or don't know	291 (82.9)	135 (61.4)	
Trigger: woman leaving, No. (%)			<.001
Yes	32 (10.5)	72 (32.7)	
No or don't know	311 (89.5)	148 (67.3)	
Trigger: woman has new relationship, No. (%)			<.001
Yes	7 (2.0)	26 (11.8)	
No or don't know	336 (98.0)	194 (88.2)	

Note. Unless otherwise noted, the referent time periods for risk variables were the year previous to the most abusive event for abused control women and the year previous to the femicide for femicide victims.

than 10% of the total) were conducted in person rather than by telephone, and thus we cannot evaluate the effects of this source of bias. Finally, we have no way to compare the control women who participated with those who did not, and women living in the most dangerous situations may have been less likely to participate as control women. If so, true exposure to the risk factors of interest among women involved in abusive intimate relationships may be greater than our control data suggest, thus inflating our estimates of increased risks associated with these exposures.

CONCLUSIONS

In light of our findings, it is important to consider the role medical professionals might play in identifying women at high risk of intimate partner femicide. The variables that remained significant in model 6 are those most important for identifying abused women at risk for femicide in the health care system and elsewhere, whereas those that were significant in model 7 are particularly important in prevention of the lethal incident itself. When women are identified as abused in medical settings, it is important to assess perpetrators' access to guns and to warn women of the risk guns present. This is especially true in the case of women who have been threatened with a gun or another weapon and in conditions of estrangement. Under federal law, individuals who have been convicted of domestic violence or who are subject to a restraining order are barred from owning firearms. Judges issuing orders of protection in cases of intimate partner violence should consider the heightened risk of lethal violence associated with abusers' access to firearms.

Often, battered women like the idea of a health care professional notifying the police for them; however, with the exception of California, states do not require health care professionals to report to the criminal justice system unless there is evidence of a felony assault or an injury from an assault.[38–40] In states other than California, the professional can offer to call the police, but the woman should have the final say, in that she can best assess any increased danger that might

TABLE 3—Hypothesized Risk Factors for Intimate Partner Femicide Among Women Involved in a Physically Abusive Intimate Relationship Within the Past 2 Years: Adjusted Odds Ratios

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Abuser age	1.10***	1.08***	NS				
Abuser race/ethnicity	NS						
Abuser education (reference group: high school graduates)							
Less than high school	1.40	NS					
Some college	0.72	NS					
College	0.31*	NS					
Abuser job status (reference group: employed full time)							
Employed part time	1.61	NS	NS	NS	NS	NS	NS
Unemployed, seeking job	1.34	NS	NS	NS	NS	NS	NS
Unemployed, not seeking job	5.09***	6.27***	4.00***	3.24***	4.28***	4.42***	4.35*
Victim age	NS						
Victim race/ethnicity	NS						
Victim education (reference group: high school graduates)							
Less than high school	1.61	NS	NS	NS			
Some college	0.87	NS	NS	NS			
College	0.31**	0.15*	0.28*	NS			
Victim job status (reference group: employed full time)							
Employed part time	0.95	NS	NS				
Unemployed, seeking job	0.13***	0.25*	NS				
Unemployed, not seeking job	0.99	NS	NS				
General risk factors for homicide							
Abuser problem drinker		NS					
Abuser used illicit drugs		4.76***	2.19*	1.88*	NS	NS	
Abuser mental health		NS					
Abuser threatened suicide		NS					
Abuser hurt pet		NS					
Abuser access to gun		7.59***	9.21***	8.28***	5.44***	5.38***	NS
Abuser arrest for violent crime		NS					
Victim problem drinker		NS					
Victim used illicit drugs		NS					
Victim sole access to gun		0.22*	NS	NS	NS	NS	NS
Relationship variables							
Married			NS				
Divorced			NS				
Time in relationship			NS				
Cohabitation (reference: living together during entire past year)							
Living together less than 1 year			NS				
Previously lived together, separated at time of incident			3.64**				
Never lived together			0.39**	0.30**	0.36*	0.34**	0.31**

Continued

result from the police being notified. An excellent resource for referral, shelter, and information is the National Domestic Violence Hotline (1-800-799-SAFE).

If a woman confides that she is planning to leave her abuser, it is critical to warn her not to confront him personally with her decision. Instead, she needs to leave when he is not present and leave a note or call him later. It is also clear that extremely controlling abusers are particularly dangerous under conditions of estrangement. A question such as "Does your partner try to control *all* of your daily activities?" (from the Danger Assessment[15]) can quickly assess this extreme need for control. Health care professionals can also expeditiously assess whether the perpetrator is unemployed, whether stepchildren are present in the home, and whether the perpetrator has threatened to kill the victim. Under these conditions of extreme danger, it is incumbent on health care professionals to be extremely assertive with abused women about their risk of homicide and their need for shelter.[41] ■

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This article was accepted September 23, 2002.

Contributors

J.C. Campbell designed the study and wrote most of the introductory and Discussion sections. D. Webster analyzed the data, wrote most of the Results section, and contributed to the Methods and Discussion sections. J. Koziol-McLain wrote the Methods section, con-

TABLE 3—*Continued*

Victim left or asked abuser to leave	3.20**	2.40**	NS		
Victim–abuser had biological child	NS				
Victim had child by a previous partner in home	2.23**	1.70	1.94*	2.44**	2.35*
Abuser–victim age difference	NS				
Abuser control of victim, verbal aggression					
Calls names		NS			
Not high control and separated after living together		3.10*	3.36*	3.64*	3.10*
High control and not separated after living together		2.90**	2.09*	2.08*	2.40*
High control and separated after living together		8.98***	4.07*	5.52**	3.43*
Abuser threats and stalking					
Threatened to harm children			NS		
Threatened to harm family			NS		
Threatened victim with weapon			4.08***	3.38***	4.41*
Threatened to kill victim			2.60**	3.22**	NS
Stalking			NS		
Physical abuse before worst incident					
Abuse increasing in frequency and severity				NS	
Choked (strangled)				NS	
Forced sex				1.87	NS
Abused when pregnant				NS	
Previous arrest for domestic violence				0.34**	0.31*
Incident-level risk factors					
Abuser used alcohol or drugs					NS
Victim used alcohol or drugs					NS
Abuser used gun					41.38**
Trigger: jealousy/victim left for other relationship					4.91***
Trigger: victim left abuser for other reasons					4.04***

Note. NS = nonsignificant.
*$P < .05$; **$P < .01$; ***$P < .001$.

tributed to the Results section, and prepared the tables. J. Manganello contributed to the data analysis and Results sections. All other authors collected data, contributed to the introductory and Discussion sections, and reviewed the article.

Acknowledgments

This research was supported by joint funding from the National Institute on Alcohol Abuse and Alcoholism, the National Institute on Drug Abuse, the National Institute of Mental Health, the National Institutes on Aging, the Centers for Disease Control and Prevention, and the National Institute of Justice (grant R01 # DA/AA11156).

We would like to thank our advocacy, criminal justice, and medical examiner collaborators at each of the sites, along with the women and family members who told their stories. We also thank Arthur Kellerman, MD, for his wise consultation and original ideas. Finally, we thank the staff of the Data Stat Survey Research Firm and Jo Ellen Stinchcomb, Nadiyah Johnson, and the many other assistants and students for all of their work.

Human Participant Protection

Institutional review board approval was obtained from each study site. Informed consent was obtained by telephone from all participants who were interviewed.

References

1. Greenfield LA, Rand MR, Craven D, et al. *Violence by Intimates: Analysis of Data on Crimes by Current or Former Spouses, Boyfriends, and Girlfriends.* Washington, DC: US Dept of Justice; 1998.

2. Mercy JA, Saltzman LE. Fatal violence among spouses in the United States: 1976–85. *Am J Public Health.* 1989;79:595–599.

3. Bailey JE, Kellermann AL, Somes GW, Banton JG, Rivara FP, Rushforth NP. Risk factors for violent death of women in the home. *Arch Intern Med.* 1997;157:777–782.

4. Bachman R, Saltzman LE. *Violence Against Women: Estimates From the Redesigned Survey.* Washington, DC: Bureau of Justice Statistics; 1995.

5. Browne A, Williams KR, Dutton DC. Homicide between intimate partners. In: Smith MD, Zah M, eds. *Homicide: A Sourcebook of Social Research.* Thousand Oaks:Sage,1998:149–164.

6. Langford L, Isaac NE, Kabat S. Homicides related to intimate partner violence in Massachusetts. *Homicide Stud.* 1998;2:353–377.

7. Moracco KE, Runyan CW, Butts J. Femicide in North Carolina. *Homicide Stud.* 1998;2:422–446.

8. Frye V, Wilt S, Schomburg D. Female homicide in New York City, 1990–1997. Available at: http://www.nyc.gov/html/doh/pdf/ip/female97.pdf. Accessed August 18, 2002.

9. National Institute of Justice. *A Study of Homicide in Eight US Cities: An NIJ Intramural Research Project.* Washington, DC: US Dept of Justice; 1997.

10. Wilt SA, Illman SM, Brodyfield M. *Female Homicide Victims in New York City.* New York, NY: New York City Dept of Health; 1995.

11. Campbell JC. "If I can't have you, no one can": power and control in homicide of female partners. In: Radford J, Russell DEH, eds. *Femicide: The Politics of Woman Killing.* New York, NY: Twayne; 1992:99–113.

12. McFarlane J, Campbell JC, Wilt S, Sachs C, Ulrich Y, Xu X. Stalking and intimate partner femicide. *Homicide Stud.* 1999;3:300–316.

13. Pataki G. *Intimate Partner Homicides in New York State.* Albany, NY: New York State Governor's Office; 1997.

14. Straus MA, Gelles RJ. *Physical Violence in American Families: Risk Factors and Adaptations to Family Violence in 8,145 Families.* New Brunswick, NJ: Transaction Publishers; 1990.

15. Johnson H, Sacco VF. Researching violence against women: Statistics Canada's national survey. *Can J Criminology.* 1995;37:281–304.

16. Campbell JC. Prediction of homicide of and by battered women. In: Campbell JC, ed. *Assessing the Risk of Dangerousness: Potential for Further Violence of Sexual Offenders, Batterers, and Child Abusers.* Newbury Park, Calif: Sage Publications; 1995 93–113.

17. Campbell JC, Sharps P, Glass NE. Risk assessment for intimate partner violence. In: Pinard GF, Pagani L, eds. *Clinical Assessment of Dangerousness: Empirical Contributions.* New York, NY: Cambridge University Press; 2000:136–157.

18. Hosmer DW, Lemeshow S. A goodness-of-fit test

for the multiple logistic regression model. *Commun Stat.* 1980;A10:1043–1069.

19. Hawkins DF. Inequality, culture, and interpersonal violence. *Health Aff (Millwood).* 1993;12:80–95.

20. Stets JE. Job autonomy and control over one's spouse: a compensatory process. *J Health Soc Behav.* 1995;35:244–258.

21. Fagan J, Stewart DE, Hansen K. Violent men or violent husbands? Background factors and situational correlates. In: Gelles RJ, Hotaling G, Straus MA, Finkelhor D, eds. *The Dark Side of Families.* Beverly Hills, Calif: Sage Publications; 1983:49–68.

22. Weiner NA, Zahn MA, Sagi RJ. *Violence: Patterns, Causes, Public Policy.* New York, NY: Harcourt Brace Jovanovich; 1990.

23. Browne A, Williams KR, Dutton DC. Homicide between intimate partners. In: Smith MD, Zahn M, eds. *Homicide: A Sourcebook of Social Research.* Thousand Oaks, Calif: Sage Publications; 1998:149–164.

24. Arbuckle J, Olson L, Howard M, Brillman J, Anctil C, Sklar D. Safe at home? Domestic violence and other homicides among women in New Mexico. *Ann Emerg Med.* 1996;27:210–215.

25. Kellerman AL, Rivara FP, Rushforth NB. Gun ownership as a risk factor for homicide in the home. *N Engl J Med.* 1993;329:1084–1091.

26. Gondolf EW. *Batterer Intervention Systems: Issues, Outcomes, and Recommendations.* Thousand Oaks, Calif: Sage Publications; 2002.

27. Daly M, Wiseman KA, Wilson M. Women and children sired by previous partners incur excess risk of uxorcide. *Homicide Stud.* 1997;1:61–71.

28. Brewer VE, Paulsen DJ. A comparison of US and Canadian findings on uxorcide risk for women with children sired by previous partners. *Homicide Stud.* 1999;3:317–332.

29. Campbell JC, Miller P, Cardwell MM, Belknap RA. Relationship status of battered women over time. *J Fam Violence.* 1994;9:99–111.

30. Wilson M, Daly M. Spousal homicide risk and estrangement. *Violence Vict.* 1993;8:3–15.

31. Dawson R, Gartner R. Differences in the characteristics of intimate femicides: the role of relationship state and relationship status. *Homicide Stud.* 1998;2:378–399.

32. Campbell JC, Soeken K, McFarlane J, Parker B. Risk factors for femicide among pregnant and nonpregnant battered women. In: Campbell JC, ed. *Empowering Survivors of Abuse: Health Care for Battered Women and Their Children.* Thousand Oaks, Calif: Sage Publications; 1998:90–97.

33. Campbell JC, Soeken K. Forced sex and intimate partner violence: effects on women's health. *Violence Women.* 1999;5:1017–1035.

34. McFarlane J, Soeken K, Campbell JC, Parker B, Reel S, Silva C. Severity of abuse to pregnant women and associated gun access of the perpetrator. *Public Health Nurs.* In press.

35. Websdale N. *Understanding Domestic Homicide.* Boston, Mass: Northeastern University Press; 1999.

36. Weisz A, Tolman R, Saunders DG. Assessing the risk of severe domestic violence: the importance of survivors' predictions. *J Interpersonal Violence.* 2000;15:75–90.

37. Saunders DG, Browne A. Intimate partner homicide. In: Ammerman RT, Hersen M, eds. *Case Studies in Family Violence.* New York, NY: Kluwer Academic Publishers; 2000:415–449.

38. Chalk R, King P. Violence in families: assessing prevention and treatment programs. In: Chalk R, King PA, eds. *Health Care Interventions.* Washington, DC: National Academy Press; 1998.

39. Gielen AC, O'Campo P, Campbell J, et al. Women's opinions about domestic violence screening and mandatory reporting. *Am J Prev Med.* 2000;19:279–285.

40. Rodriguez MA, McLoughlin E, Nah G, Campbell JC. Mandatory reporting of domestic violence injuries to the police: what do emergency department patients think? *JAMA.* 2001;286:580–583.

41. Wadman MC, Muelleman RL. Domestic violence homicides: ED use before victimization. *Am J Emerg Med.* 1999;17:689–691.

ATTACHMENT C

EVALUATION REVIEW

A JOURNAL OF APPLIED SOCIAL RESEARCH

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A JOURNAL OF APPLIED SOCIAL RESEARCH

Volume 30 Number 3 *June 2006*

Special Issue: **Intimate Partner Violence and Firearms**
Editor: **Susan B. Sorenson**

CONTENTS

Note From Special Issue Editor

Dedication

In memory of Linda Saltzman and Susan Schechter.

Acknowledgment

I would like to express my appreciation to the reviewers for this special issue: Sarah Buel, Philip J. Cook, Jeffrey Fagan, Victoria Holt, Arthur Kellermann, Judith McFarlane, Carol Runyan, and Franklin Zimring. Thanks also goes to the Joyce Foundation, whose support allowed for the compilation of the papers and the dissemination of the journal to policy makers, state attorneys general, district and city attorneys, law enforcement officers, chief probation officers, judges, prevention advocates, and researchers.

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FIREARM USE IN INTIMATE PARTNER VIOLENCE

A Brief Overview

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Readers of this volume are likely to have specific interests in domestic violence or in firearms policy. It is not assumed, however, that the typical reader will know about the interface of the two fields. Thus, the volume begins with a synopsis of the epidemiology of weapon use in intimate partner violence. The purpose of this article is to help readers better understand the nature of the problem, obtain knowledge that will provide a context for the policy, and understand practice implications of the articles that follow.

Keywords: *firearms; intimate partner violence; violence prevention; policy; norms*

When people speak of murder, they usually think of men—men as victims, men as perpetrators. Although men's risk of homicide is higher than that of women, few realize that homicide ranks similarly as a cause of death for men and women. As shown in Table 1, homicide is the second leading cause of death for adolescents and young adults in the United States—for both men and women. Firearms are the most commonly used weapon in the homicide of men and women.

There are important differences, however, in the homicides of men and women. Two primary differences are the place of the homicide and the nature of the victim-suspect relationship. Men are most likely to be killed in the street or other public place; women are most likely to be murdered at home. Acquaintances pose the greatest risk to men; current or former

AUTHOR'S NOTE: *For a more detailed review, the interested reader is referred to Sorenson (2006). This special issue is dedicated to the memory of Linda Saltzman and Susan Schechter. I would like to express my appreciation to the reviewers for this special issue: Sarah Buel, Philip J. Cook, Jeffrey Fagan, Victoria Holt, Arthur Kellermann, Judith McFarlane, Carol Runyan, and Franklin Zimring. Thanks also goes to the Joyce Foundation, whose support allowed for the compilation of the papers and the dissemination of the journal to policy makers, state attorneys general, district and city attorneys, law enforcement officers, chief probation officers, judges, prevention advocates, and researchers.*

EVALUATION REVIEW, Vol. 30 No. 3, June 2006 229-236
DOI: 10.1177/0193841X06287220

SEPARATING BATTERERS AND GUNS

A Review and Analysis of Gun Removal Laws in 50 States

SHANNON FRATTAROLI
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Firearms play an important role in lethal domestic violence incidents. The authors review state laws regarding two policies to separate batterers from firearms: laws authorizing police to remove firearms when responding to a domestic violence complaint ("police gun removal laws") and laws authorizing courts to order guns removed from batterers through a protective order ("court-ordered removal laws"). As of April 2004, 18 states had police gun removal laws; 16 states had court-ordered removal laws. The authors examine relevant characteristics of the laws and recommend that these laws be mandatory, apply to all guns and ammunition possessed by an abuser, and include clear procedures to enhance implementation.

Keywords: *domestic violence; firearms; police; courts; law; protective order*

Domestic violence is a problem that negatively impacts the health and well-being of the U.S. population. Recent survey data indicate that approximately 22% of women and 7% of men report some physical intimate partner abuse during their lifetime. Among abused women, approximately 4% report being threatened with a gun by their abuser and 1% sustained a domestic violence gun-related injury (Tjaden and Thoennes 1998). Although a minority of women experience gun-related abuse, the lethal nature of firearms significantly increases the risk of severe injury and death for the victims of abusers who turn to guns as a mechanism for exerting power and control.

A gun in a violent home elevates the risk that domestic violence will result in death. One study of abused women demonstrates a fivefold increase in women's homicide risk when the abusive partner owns a gun (Campbell et al. 2003). When domestic violence incidents involve a firearm, the abuse is 12 times more likely to result in a death compared to non-firearm abuse incidents (Saltzman et al. 1992).

Some policy makers have responded with legislation intended to restrict batterers' access to firearms. At the federal level, the Violent Crime Control and Law Enforcement Act of 1994 expanded the list of people prohibited from purchasing or possessing a firearm to include individuals subject to certain restraining orders (Violent Crime Control and Law Enforcement Act 2005). In 1996, President Clinton signed into law the Lautenberg Amendment, which prohibited individuals convicted of misdemeanor domestic violence assault from purchasing or possessing guns (Gun Ban for Individuals Convicted of a Misdemeanor Crime of Domestic Violence 2005).

Some states have enacted additional policies to separate batterers and guns. In particular, policies that vest law enforcement with the authority to remove guns when responding to a domestic violence incident ("police gun removal laws") or empower courts to order alleged batterers to surrender their firearms through civil protective orders ("court-ordered removal laws") actively engage the criminal justice system in the process of removing firearms from individuals who are violent toward their intimate partners.[1] Importantly, the court-ordered removal laws provide states with a means of enforcing the federal law as it pertains to gun possession; police removal laws extend the Lautenberg Amendment prohibition on domestic violence misdemeanants to allow law enforcement to temporarily remove guns in the absence of a conviction. As such, these laws are an important complement to federal law. If designed and implemented effectively, such laws have the potential to reduce the risks associated with armed batterers.

Research concerning the implementation of these two laws in Maryland, however, identified significant barriers to implementation. One challenge to implementation that emerged from this analysis was the language of the law itself, as measured by implementers' ability to translate the written law into action (Frattaroli and Teret 2006 [this issue]).

In an effort to better understand these two types of state-level policies aimed at separating batterers and guns, we collected and analyzed state codes containing these provisions. The purpose of this research is to provide policy makers and advocates with an overview of the content of police gun removal and court-ordered removal laws. We also seek to inform research efforts regarding variation among state laws and consider the implications of this variation for policy evaluation. Finally, our results provide the basis for a set of recommendations aimed at policy makers, advocates, and researchers concerning how best to maximize the potential of police gun removal and court-ordered removal laws.

AUTHORS' NOTE: *This research was supported by grants to the Johns Hopkins Center for Gun Policy and Research from the Funders' Collaborative for Gun Violence Prevention and The Joyce Foundation. We thank Susan DeFrancesco, Nancy Lewin, Jennifer Manganello, and Matthew Pierce for their research assistance.*

EVALUATION REVIEW, Vol. 30 No. 3, June 2006 296-312
DOI: 10.1177/0193841X06287680

METHODS

CASE DEFINITION

To identify relevant state laws, we began by establishing a case definition for the laws of interest. For police gun removal laws, we included laws that either required law enforcement to remove guns from the alleged batterer or simply permitted their removal. We excluded laws that applied only when police were responding to a violation of a preexisting protective order and general violations of criminal law that were not specific to domestic violence. We also excluded laws that granted only generalized authority to police to take action to minimize danger to domestic violence victims, but which were not specific to weapons or firearms.

For court-ordered removal laws, we included laws that required or permitted courts to invoke this power. We excluded laws that simply forbid the possession or future purchase of firearms by persons subject to a protective order, without referring to the removal of guns. As with police gun removal laws, we also excluded court-ordered removal laws that could only be invoked after a protective order had been violated or that contained only general language allowing courts to protect victims but did not specifically authorize gun removal.

In developing the case definitions for these searches, we were interested in laws with the most "upstream" approaches to preventing firearm-related domestic violence within the context of court and police responses. Therefore, we excluded laws that restricted gun removal to protective order violators even though these individuals may be at high risk of perpetrating violence.

DATA COLLECTION

We used a variety of legal research strategies to determine if each of the 50 states had either of the two laws. Each state's set of laws (the state code) was examined with a computerized legal research tool, either Lexis-Nexis or WestLaw. Each is a full-text searchable database containing the complete text of every statute in every state. Initially, we used words and phrases likely to appear in the relevant laws, and then we refined the process for later states with words from laws we identified early on. We also reviewed the state codes and their indexes in several local law libraries. Each of the state laws was independently reviewed by two legal researchers. Finally, we compared our findings with existing compilations of domestic violence laws (Jose 2003; Pennsylvania Coalition Against Domestic Violence 2000).

Wherever differences were noted, we reexamined that state's law to resolve the discrepancy.

We excluded Washington, D.C., from our analyses. In 1976, the District of Columbia banned the private ownership of most firearms. Therefore, the District's firearm laws are significantly different from those of the 50 states. We also excluded laws in which potentially relevant language appeared only in sample protective orders but not in the state code itself. We completed data collection in April 2004. Therefore, any state laws enacted after April 2004 are not included in our analysis.

DATA ANALYSIS

For both police gun removal laws and court-ordered removal laws, we began with a close reading of each state law. Based on this examination, we developed a set of important components shared by many of the laws. Using these recurring features of the laws, we arrayed the laws in tables designed to both summarize their relevant characteristics and to help identify patterns in the laws (see Tables 1 and 2).

We also apply our knowledge of domestic violence law and policy to the analysis of these state laws. Based on prior evaluations of the implementation and effects of other laws, as well as the goals of the two laws examined in this article, we consider how the various components of the laws might help or hinder the achievement of their goals. We conclude with a set of recommendations for advocates, policy makers, and researchers.

RESULTS

As of April 2004, 18 states had a law that authorized police to remove firearms when responding to a domestic violence incident. Sixteen state codes included provisions that allow courts to order firearms removed when issuing a protective order. Ten states had both laws; 26 states had neither law. We summarize important characteristics of the police gun removal laws in Table 1; Table 2 summarizes characteristics of the court-ordered gun removal laws.

POLICE GUN REMOVAL LAWS

In 8 of the 18 police gun removal law states, police are required to remove firearms when responding to a domestic violence incident ("shall

(text continues on p. 306)

TABLE 1: Law Enforcement Authority to Remove Guns When Responding to a Domestic Violence Incident

State	Statutory Section	May or Shall Authority	Ammunition Included in Removal Authority	Removal Requires Arrest of Alleged Abuser	Removal Requires That a Gun Be Used or Threatened in the Domestic Violence Incident	Eligible Guns: In Plain View and/or Pursuant to Consensual Search	Removal Requires Guns Expose Someone to Danger	Eligible Guns: Guns Used in Domestic Violence (D.V.) vs. All Guns
AK	18-65-515(b)	May	No	No	No for guns in plain view; yes for other guns[a]	Yes (plain view) for non-D.V. guns; no for D.V. guns[a]	Yes	All guns[a]
AZ	13-3601(C)	May	No	No	No	Plain view or pursuant to consensual search	Yes	All guns
CA	12028.5(b)	Shall	No	No	No	Plain view or pursuant to consensual search	Yes	All guns
CT	46b-38b	May	No	Yes	No	Plain view or in alleged batterer's possession	No	All guns
HI	134-7.5 709-906	May	Yes	No	No for guns in plain view or discovered pursuant to consensual search; yes for other guns[b]	Plain view or pursuant to consensual search for non-D.V. guns[b]	Yes	All guns[b]
IL	725 S 5/112A-30; 750 S 60/304	Shall	No	No	Yes	No	No	D.V. guns only
IN	35-33-1-1.5	May	Yes	No	Gun used in D.V. incident or immediate risk to victim[c]	Plain view[c]	Gun used in D.V. incident or immediate risk to victim[c]	All guns[c]
MD	4-511	May	No	No	No	Plain view	No	All guns
MT	46-6-603	Shall	No	No	Yes	No	No	D.V. guns only
NE	29-440	May and Shall[d]	Yes for may authority; no for shall authority[d]	Yes	No for may authority; yes for shall authority[d]	Yes for may authority; no for shall authority[d]	Yes for may authority; no for shall authority[d]	All guns for may authority; D.V. guns only for shall authority[d]
NH	173 B:9 173 B:10	Shall	Yes	No	No	No	No	All guns
NJ	2C:25-21	May	No	No	No	No[e]	Yes	All guns
OH	2935.03	Shall	No	No	Yes	No	No	D.V. guns only
OK	60.08	Shall	No	Yes[f]	Yes	No	No	D.V. guns only
PA	2711	Shall	No	Yes	Yes	No	No	D.V. guns only

(continued)

TABLE 1 (continued)

State	Statutory Section	May or Shall Authority	Ammunition Included in Removal Authority	Removal Requires Arrest of Alleged Abuser	Removal Requires That a Gun Be Used or Threatened in the Domestic Violence Incident	Eligible Guns: In Plain View and/or Pursuant to Consensual Search	Removal Requires Guns Expose Someone to Danger	Eligible Guns: Guns Used in Domestic Violence (D.V.) vs. All Guns
TN	36-3-620	May and Shall[g]	No	Yes for may authority; no for shall authority	No for may authority; yes for shall authority[g]	Yes for may authority; no for shall authority[g]	Yes for may authority; no for shall authority[g]	All guns for may authority; D.V. guns only for shall authority[g]
UT	77-36-2.1	Shall	No	No	Yes	No	No	D.V. guns only
WV	48-27-1002	May and Shall[h]	No	Yes	No for may authority; yes for shall authority[h]	Yes for may authority; no for shall authority[h]	Yes for may authority; no for shall authority[h]	All guns for may authority; D.V. guns only for shall authority[h]

a. Under Alaska law, officers may remove guns not used in the domestic violence incident if the guns are in plain view. Guns used in the incident are eligible for removal but not subject to the plain view requirement.
b. Under Hawaii law, officers may remove guns not used in the domestic violence incident if the guns are in plain view or discovered pursuant to a consensual search. Guns used in the incident are eligible for removal but not subject to the plain view/consensual search requirement.
c. Indiana law includes those firearms within the removal authority that were an instrument of crime or expose the victim to immediate risk and are observed at the scene.
d. Nebraska law enforcement may remove all guns and ammunition in plain view or pursuant to a consensual search as necessary for protection. They shall remove guns (but not ammunition) used or threatened in a domestic violence incident. The shall authority is not subject to the plain view/consensual search requirement.
e. New Jersey law enforcement may question people at the scene to determine if guns are present and may remove any guns revealed through questioning or observation.
f. Oklahoma law authorizes law enforcement to remove firearms "provided an arrest is made, if possible, at the same time."
g. Under Tennessee law, officers may remove guns not used in the domestic violence incident if the guns are in plain view or discovered pursuant to a consensual search as necessary for protection. Guns used in the incident shall be removed but are not subject to the plain view/consensual search requirement.
h. Under West Virginia law, officers may remove guns not used in the domestic violence incident if the guns are in plain view or discovered pursuant to a consensual search as necessary for protection. Guns used in the incident shall be removed but are not subject to the plain view/consensual search requirement.

TABLE 2: Court Authority to Order Removal of Guns

State	Statutory Section	May or Shall Authority	Ammunition Included in Removal Authority	Type of Protective Order(s) Included	Removal Requires That a Gun Be Used or Threatened in the Domestic Violence Incident	Eligible Guns: Guns Used in Domestic Violence (D.V.) vs. All Guns	Responsibility for Gun Removal
AK	18-66-100(b)(7)	May	No	Permanent	Yes[a]	All guns	Respondent
AZ	13-36-02(G)(4)	May[b]	No	Permanent	No	All guns	Respondent
CA	6389	Shall	No	Temporary and permanent	No	All guns	Respondent
DE	1045	May	No	Temporary and permanent	No	All guns	Respondent
HI	134-7(f)	Shall	Yes	Temporary and permanent	Required for temporary orders not required for permanent orders	All guns	Respondent and law enforcement[c]
IL	725 S5/112A-14; 750 S60/214}	Shall	No	Permanent	Yes[d]	All guns	Respondent and law enforcement[e]
IN	34-26-5-9	May	Yes	Permanent	No	All guns	Respondent

(continued)

TABLE 2 (continued)

State	Statutory Section	May or Shall Authority	Ammunition Included in Removal Authority	Type of Protective Order(s) Included	Removal Requires That a Gun Be Used or Threatened in the Domestic Violence Incident	Eligible Guns: Guns Used in Domestic Violence (D.V.) vs. All Guns	Responsibility for Gun Removal
MD	4-506	May	No	Permanent	No	All guns	Respondent
MA	209 A 3B	Shall[f]	Yes	Temporary and permanent	No	All guns	Law enforcement
NH	173 B:9	May	Yes	Temporary and permanent	No	All guns	Respondent and law enforcement[g]
NJ	2C:25-28; 2C:25-29	May	No	Temporary and permanent	No	All guns	Law enforcement
NY	842.a1.a2.a5	May and Shall[h]	No	Temporary and permanent	Yes[h]	All guns	Respondent
NC	50 B-3	Shall	Yes	Temporary and permanent	Yes[i]	All guns	Respondent
ND	14-07.1-02.4.g 14-07.1-03.2.d	May	No	Temporary and permanent	Yes[j]	All guns	Respondent
PA	6108	May	No	Permanent	Yes	D.V. guns only	Respondent
WI	813.12	Shall	No	Permanent	No	All guns	Respondent

a. Alaska law requires that the respondent be in actual possession of a firearm or use a firearm during the offense.
b. Arizona courts may prohibit firearm possession and purchase. If the court does so, it then shall order the respondent to surrender his firearms.
c. Hawaii law authorizes law enforcement to remove a gun in plain view or pursuant to a consent search when serving an order.
d. Illinois courts' authority applies when gun threat or use is likely and the court is satisfied that danger exists.
e. Illinois law permits courts to order guns seized if the respondent fails to appear at the protective order hearing.
f. Massachusetts law requires courts to order guns removed if the respondent demonstrates immediate danger of abuse.
g. New Hampshire courts may order the respondent to surrender or may issue a search warrant authorizing law enforcement to remove guns.
h. New York courts may include gun removal in temporary and permanent orders if there is substantial risk that the respondent may use or threaten to use a firearm against the victim. New York courts shall issue a permanent order if the domestic abuse incident involved a threat or use of a deadly weapon.
i. North Carolina law requires that one of four conditions be met before courts shall remove guns. One of those conditions is use or threatened use of a deadly weapon or a pattern of prior conduct involving the use or threatened use of a firearm against persons.
j. North Dakota courts may order guns removed if there is probable cause that a respondent is likely to use, threaten, or display a firearm in future acts of violence.

remove" states), whereas in 7 others, police are permitted but not required to do so ("may remove" states). Three other states (NE, TN, WV) use both "shall" and "may" language. Whether law enforcement authority to remove firearms in these states is mandatory or discretionary varies by circumstance, as detailed in Table 1. For example, in West Virginia, law enforcement "shall" remove firearms involved in the domestic violence assault and "may" remove other weapons in plain view or discovered pursuant to a consensual search, as necessary for protection.

Only four states (HI, IN, NE, NH) include the authority to seize ammunition within police gun removal laws. In Nebraska, law enforcement may remove ammunition if it is in plain view and when removal is necessary to ensure the safety of the police officer or others.

In five states (CT, NE, OK, PA, WV), law enforcement may only remove a gun if the abuser is arrested. In one other state (TN), removal of firearms used in the domestic violence event does not require an arrest; removal of other guns is authorized only if the abuser is arrested.

There is considerable variation among the states regarding whether a firearm must have been used in the domestic violence incident itself to authorize removal of firearms. Equal numbers of states (six in each category) require that a firearm was used in the domestic violence incident, do not impose this requirement, or vary the requirement depending on other factors. In this latter category, for example, Nebraska law requires all firearms used in the domestic violence incident to be removed; law enforcement may also remove other guns in plain view or discovered through a consensual search under Nebraska's police gun removal law.

Four states (AZ, CA, IN, MD) specify that only firearms in the "plain view" of the officer or discovered pursuant to a consensual search can be removed. Eight states do not impose this condition, and six others impose it under certain circumstances or for certain weapons (for example, those not used in the domestic violence incident). Five state laws (AK, AZ, CA, HI, NJ) permit, or in California require, law enforcement to remove firearms only when they potentially expose the victim, officer, or others to danger.

Police gun removal laws apply to all firearms owned or possessed by the alleged batterer in nine states, provided other criteria specified by the states' laws are met. In Hawaii, for example, firearms used in a domestic violence assault may be seized; other firearms may be seized only if they are in plain view or discovered through a consensual search, and where removal is necessary for the protection of the officer or others. The three state laws that apply either "may" or "shall" authority (NE, TN, WV), depending on the circumstances of the incident, include all guns in the may remove authority and only domestic violence guns in the shall remove

circumstances. Six states (IL, MT, OH, OK, PA, UT) limit removal authority to firearms actually involved in the domestic violence incident.

Finally, 10 state laws (AK, AZ, CA, CT, HI, IL, MD, MT, NJ, OK) specify the duration that firearms may be removed from the abuser (not in Table 1). Often, these states impose relatively brief time periods (for example, 7 days or less in several states) unless the firearm is needed for evidence in a criminal prosecution or the abuser is deemed ineligible to possess firearms. Eight others provide no specific time frame for the return of seized firearms.

COURT-ORDERED REMOVAL LAWS

We identified 16 states with court-ordered removal laws. Six state laws mandate courts to order the removal of firearms under specified circumstances through "shall" remove language (CA, HI, IL, MA, NC, WI), and nine states allow the courts some discretion in deciding whether to include gun removal as part of a protective order (may remove states). New York law requires courts to order surrender if the reported abuse involved the use or threatened use of a deadly weapon; they *may* (but are not required to) order gun removal upon finding a substantial risk that a gun may be used against the victim in future incidents. Court-ordered removal laws apply to all guns in a respondent's possession, with the exception of Pennsylvania's law, which limits removal to only those guns used in the abuse incident. In addition to ordering guns surrendered, five states (HI, IN, MA, NH, NC) explicitly include ammunition within their court-ordered removal laws.

Although civil protection laws for domestic violence victims vary among the states, they generally offer some form of immediate, temporary relief and some form of longer term, more permanent relief. Seven state laws authorize courts to order guns removed through permanent civil protective orders, and nine extend this authority to both temporary and permanent orders. No state law restricted the removal authority to temporary orders.

Court-ordered removal laws in six states (AK, IL, NY, NC, ND, PA) apply only when the reported abuse includes the use or threatened use of a gun or weapon, whereas nine state laws do not restrict the court's gun removal authority in this way. Under Hawaii law, courts must order guns surrendered for all permanent orders regardless of gun involvement, but when issuing temporary orders, the removal law applies only when "a firearm may be used to threaten or harm a person."

Our review of court-ordered removal laws revealed two mechanisms for the actual removal. Five state laws (HI, IL, MA, NH, NJ) authorize law

enforcement to seize guns under certain circumstances. Massachusetts and New Jersey rely solely on law enforcement to remove guns upon service of the order (MA) or as specified by the terms of the order (NJ). In contrast, Hawaii, Illinois, and New Hampshire laws vest respondents or law enforcement with removal responsibility, depending on the circumstances of the case or the courts' discretion. For example, if a respondent fails to turn over the gun(s) upon service of an order in Hawaii, law enforcement must apply to the court for a search warrant. Eleven state laws depend on respondents to surrender their firearms in accordance with the terms of an order.

In addition to the findings presented in Table 2, we also noted legislative language concerning how the court-ordered removal laws are to be implemented. For example, some state laws (AZ, CA, MA, NY, NC) offer detailed instructions regarding when gun removal occurs (immediately upon service of the order, within 24 hours, etc.), require court notification once removal occurs (CA, NY), specify who can legally receive surrendered guns (AZ, CA, DE, HI, IL, IN, MD, MA, NH, NC, ND, PA, WI), or provide provisions for the return of removed guns (NC, PA, and WI).

We also noted provisions of court-ordered removal laws that permit law enforcement to charge storage fees (CA, WI) and allow subcontracts with federally licensed firearm dealers to provide storage for removed guns (NC). Two states require additional measures that may increase the likelihood that the court-ordered removal will occur. California law requires courts to verbally inform both parties in the proceedings that the respondent cannot possess firearms while the order is in effect. As part of the temporary and permanent protective order hearings in North Carolina, judges must ask if respondents have access to firearms. Both provisions establish an active role for the courts in seeking information about the presence of firearms.

DISCUSSION

We discuss our findings in the context of implications for policy, advocacy, and research. These three sets of implications underscore the most important lesson from this review and analysis: Among similar state laws, there is the potential for wide variation. This variation affects the substance of the laws in ways that may affect the implementation and ultimate impact of the laws. There is also great variation in the sociopolitical characteristics of states with one or both removal laws, indicating that policy success is not limited to a particular type of state.

POLICY IMPLICATIONS

Policy makers have many options for structuring new removal laws or amending existing laws that aim to separate batterers and guns. The decision to mandate use of these laws through "shall" language as opposed to "may" maximizes the likelihood that police and courts will apply these laws consistently, and without regard to individual circumstances or personal opinions. To the extent that "shall" laws increase the use of and consistency with which the laws are applied, domestic violence victims and advocates can seek assistance with clearer expectations.

From a public health perspective, domestic violence gun laws should be preventive, not merely reactive. Laws that require a firearm to be part of the domestic violence incident and limit the removal to guns used against the victim are a response to a potentially lethal act of violence. In contrast, laws that do not use gun-involved violence as a criterion for gun removal reflect an approach that seeks to remove a lethal weapon before it becomes part of the abuse.

Consideration of the circumstances under which removal is authorized and how it takes place is important. Court-ordered removal policies that specify a role for law enforcement in removing guns are responsive to a foreseeable and documented challenge to implementing court-ordered removal laws: the respondent's failure to comply (Frattaroli and Teret 2006). Specific roles for law enforcement will likely necessitate additional training to assure that officers are skilled in applying both gun removal laws. For example, many state police gun removal laws condition removal on the firearms exposing the victims, officer, or others to danger. Training programs that develop officers' ability to appropriately interpret and execute these policies are important and should be funded. Additional strategies with the potential to address the court-ordered removal law compliance challenge are those provisions that allow the court to monitor compliance by requiring proof of surrender or that impose specific time frames for compliance with an order.

Laws that include provisions to help address resource challenges, such as storage and maintenance of removed guns by allowing law enforcement to charge storage fees or subcontract with federally licensed firearm dealers to provide storage, may also facilitate implementation of these laws.

ADVOCACY IMPLICATIONS

The results of this analysis can be helpful to advocates of domestic violence gun policy. Advocates working at the state level can use these

findings to assess their states' policies and determine if their police and court-ordered gun removal laws are adequate. For advocates in states where these laws do not exist, careful consideration of the variation among existing state laws can help shape the advocacy policy agenda on this issue.

Given that half of states have neither type of gun removal law, policy making in this area is needed to improve victim safety. Importantly, supporters of such efforts can be encouraged by the great variation in the sociopolitical characteristics of states with one or both removal laws in place, indicating that policy success is not limited to a particular type of state. Although gun violence prevention policies are generally controversial and often difficult to enact, policies that address the risks to domestic violence victims associated with armed batterers may be better received by elected officials and the public than more general gun violence prevention policies.

In addition to policy making, there is a role for advocates in ensuring the implementation of these laws. Advocates who understand the status of laws in their own states, and the legislative approaches employed in others, can encourage implementers (judges, law enforcement) to maximize use of these laws. In addition, advocates can work with implementers to identify challenges to implementation and work toward the necessary legislative, regulatory, or administrative changes that will facilitate implementers' use of these laws. By directing attention to the potential importance of these laws for domestic violence victims and establishing an interest in ensuring their implementation, advocates can provide an important incentive for ensuring that the police and court-ordered gun removal laws are translated from policy into potentially life saving actions.

RESEARCH IMPLICATIONS

Understanding the extent to which police and court-ordered gun removal laws are being implemented and the factors that influence their implementation is an important component of policy analysis, which is virtually absent from the literature. Such research can be used to guide decisions about the content of these laws, inform state and local leaders about how best to support and ensure implementation, and provide advocates with empirical evidence about how to most effectively direct their efforts.

Our results are also relevant to outcome evaluation research. Given the variation across states in the details of these two laws, an important consideration when evaluating laws is whether and to what extent multistate outcome data for policies with similar aims should be combined. There are

several advantages to combining evaluation data across states, including increased power and generalizability. However, when the details of a seemingly similar set of laws are different in ways that may influence whether and the extent to which the laws achieve their aims, consideration of these differences in the evaluation design is warranted.

RECOMMENDATIONS

Violent partners should not have access to firearms, even if they have not previously used or threatened to use a firearm. Federal laws were passed in the 1990s to reduce batterers' access to firearms; however, states' ability to enforce such laws is defined by the availability of enforcement mechanisms. To address the risks associated with armed batterers, state legislation is needed. Our review of two types of state laws revealed that about half of states (26) do not have either a court-ordered removal law or a police gun removal law. These laws are potentially valuable tools for protecting domestic violence victims.

Based on our analysis of the relevant characteristics of these laws, we recommend that court-ordered removal and police gun removal laws incorporate the following:

- Mandatory provisions ("shall remove" laws) that limit police or court discretion and, therefore, facilitate consistent implementation are preferable to nonmandatory ("may remove") laws.
- Removal authority that is not limited to guns actually involved in the domestic violence incident. Any gun in the batterer's possession has the potential to harm his partner.
- Including ammunition within the removal authority. Guns simply don't work without ammunition, and removal of ammunition imposes one more obstacle for batterers who might, perhaps impulsively, seek to harm a partner.
- Clear procedures for the mechanism, immediacy, and duration of the removal, and funding to train law enforcement. Such procedures aid implementation and ensure fairness.

These features likely will improve implementation and, by extension, effectiveness.

Given the risks associated with gun ownership by batterers, there is an urgent need for progress. This compilation of laws can serve as a resource for policy makers and advocates interested in strengthening state laws to better protect domestic violence victims and can inform a future research agenda regarding domestic violence and gun policies.

NOTE

1. Some state laws rely on batterers to relinquish their guns, so "removal laws" may not be an ideal label for the two laws we include under this heading. We believe, however, that the "removal" label accurately applies to the laws included in this review because the guns are ultimately removed if the laws are successfully implemented. To our knowledge, there is no other generally accepted name for these laws.

REFERENCES

Campbell, J. C., D. Webster, J. Koziol-McLain, C. Block, D. Campbell, M. A. Curry, F. Gary, N. Glass, J. McFarlane, C. Sachs, P. Sharps, Y. Ulrich, S. A. Wilt, J. Manganello, X. Xu, J. Schollenberger, V. Frye, and K. Laughon. 2003. Risk factors for femicide in abusive relationships: Results from a multisite case study. *American Journal of Public Health* 93:1089-97.

Frattaroli, S., and S. P. Teret. 2006. Understanding and informing policy implementation: A case study of the domestic violence provisions of the Maryland Gun Violence Act. *Evaluation Review* 30:347-360.

Gun Ban for Individuals Convicted of a Misdemeanor Crime of Domestic Violence, Pub. L. No. 104-208 § 658 codified as amended at 18 U.S.C. § 922(d)(9), (g)(9) (2005).

Jose, J. 2003. *Disarming domestic violence abusers: States should close legislative loopholes that enable domestic abusers to purchase and possess firearms.* Los Angeles: Brady Campaign to Prevent Gun Violence United with the Million Mom March.

Pennsylvania Coalition Against Domestic Violence. 2000. Firearms and domestic violence: State and territorial statutes. Harrisburg: Pennsylvania Coalition Against Domestic Violence.

Saltzman, L. E., J. A. Mercy, P. W. O'Carroll, M. L. Rosenberg, and P. H. Rhodes. 1992. Weapon involvement and injury outcomes in family and intimate assaults. *Journal of the American Medical Association* 267:3043-7.

Tjaden, P., and N. Thoennes. 1998. *Prevalence, incidence, and consequences of violence against women: Findings from the National Violence Against Women Survey.* Washington, DC: U.S. Department of Justice, National Institute of Justice.

Violent Crime Control and Law Enforcement Act of 1994, Pub. L. No. 103-22 codified as amended at 18 U.S.C. § 922(d)(8), (g)(8) (2005).

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DO LAWS RESTRICTING ACCESS TO FIREARMS BY DOMESTIC VIOLENCE OFFENDERS PREVENT INTIMATE PARTNER HOMICIDE?

ELIZABETH RICHARDSON VIGDOR
Duke University

JAMES A. MERCY
Centers for Disease Control and Prevention

Domestic violence imposes a large cost on society. The authors exploit state variation in timing to examine the impact of three types of law on intimate partner homicides. These laws restrict access to firearms by individuals who are subject to a restraining order or have been convicted of a domestic violence misdemeanor or allow law enforcement officers to confiscate firearms at a domestic violence scene. The authors find that female intimate partner homicide rates decline 7% after a state passes a restraining order law. They find no effect from the domestic violence misdemeanor or confiscation laws.

Keywords: *firearms; domestic violence; intimate partner homicide*

On average, 3.5 people are killed by intimate partners every day in the United States, and many others are injured. Approximately 1 in 3 female homicide victims and 1 in 20 male homicide victims are killed by current or former spouses or boyfriends each year. About 60% of these homicides were committed using a firearm (Puzone et al. 2000). This intimate partner violence imposes a substantial economic cost: In 1995, the direct cost alone

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We are grateful to Phil Cook, Brian Jacob, Mark Kleiman, John Laub, Jens Ludwig, Will Manning, Susan Sorenson, Jacob Vigdor, Garen Wintemute, participants in the Brookings Conference on Gun Violence, and two anonymous reviewers for many helpful comments. We also thank Sneha Desai, Laura Lindsey, Julie Morse, Althea Sircar, and Ling Lew for outstanding research assistance and Patricia Holmgreen and Yongli Lily Xi for preparation of the data set used in our analysis. We take full responsibility for any errors.

EVALUATION REVIEW, Vol. 30 No. 3, June 2006 313-346
DOI: 10.1177/0193841X06287307

ATTACHMENT D

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Volume 30 Number 3 *June 2006*

Special Issue: **Intimate Partner Violence and Firearms**
Editor: **Susan B. Sorenson**

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Note From Special Issue Editor

Dedication

In memory of Linda Saltzman and Susan Schechter.

Acknowledgment

I would like to express my appreciation to the reviewers for this special issue: Sarah Buel, Philip J. Cook, Jeffrey Fagan, Victoria Holt, Arthur Kellermann, Judith McFarlane, Carol Runyan, and Franklin Zimring. Thanks also goes to the Joyce Foundation, whose support allowed for the compilation of the papers and the dissemination of the journal to policy makers, state attorneys general, district and city attorneys, law enforcement officers, chief probation officers, judges, prevention advocates, and researchers.

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Evaluation Review (ER) is the forum for researchers, planners, and policy makers engaged in the development, implementation, and utilization of studies aimed at the betterment of the human condition. The Editors invite submission of papers reporting the findings of evaluation studies in such fields as child development, health, education, income security, manpower, mental health, criminal justice, and the physical and social environments. In addition, *ER* will contain articles on methodological developments, discussions of the state of the art, and commentaries on issues related to the application of research results. Special issues are sets of articles on a common theme assembled by special guest editors.

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Evaluation Review (ISSN 0193-841X) (J248) is published six times annually—in February, April, June, August, October, and December—by Sage Publications, Thousand Oaks, CA 91320. Periodicals postage paid at Thousand Oaks, California, and at additional mailing offices.

Subscription Information: All subscription inquiries, orders, back issues, claims, and renewals should be addressed to Sage Publications, 2455 Teller Road, Thousand Oaks, CA 91320; telephone: (800) 818-SAGE (7243) and (805) 499-9774; fax: (805) 499-0871; e-mail: journals@sagepub.com; http://www.sagepublications.com. **Subscription Price:** Institutions: $711; Individuals. $126. For all customers outside the Americas and Asia, please visit http://www.sagepublications.com/journalsce/ for ordering instructions. **Claims:** Claims for undelivered copies must be made no later than six months following month of publication. The publisher will supply missing copies when losses have been sustained in transit and when the reserve stock will permit.

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FIREARM USE IN INTIMATE PARTNER VIOLENCE

A Brief Overview

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Readers of this volume are likely to have specific interests in domestic violence or in firearms policy. It is not assumed, however, that the typical reader will know about the interface of the two fields. Thus, the volume begins with a synopsis of the epidemiology of weapon use in intimate partner violence. The purpose of this article is to help readers better understand the nature of the problem, obtain knowledge that will provide a context for the policy, and understand practice implications of the articles that follow.

Keywords: *firearms; intimate partner violence; violence prevention; policy; norms*

When people speak of murder, they usually think of men—men as victims, men as perpetrators. Although men's risk of homicide is higher than that of women, few realize that homicide ranks similarly as a cause of death for men and women. As shown in Table 1, homicide is the second leading cause of death for adolescents and young adults in the United States—for both men and women. Firearms are the most commonly used weapon in the homicide of men and women.

There are important differences, however, in the homicides of men and women. Two primary differences are the place of the homicide and the nature of the victim-suspect relationship. Men are most likely to be killed in the street or other public place; women are most likely to be murdered at home. Acquaintances pose the greatest risk to men; current or former

AUTHOR'S NOTE: *For a more detailed review, the interested reader is referred to Sorenson (2006). This special issue is dedicated to the memory of Linda Saltzman and Susan Schechter. I would like to express my appreciation to the reviewers for this special issue: Sarah Buel, Philip J. Cook, Jeffrey Fagan, Victoria Holt, Arthur Kellermann, Judith McFarlane, Carol Runyan, and Franklin Zimring. Thanks also goes to the Joyce Foundation, whose support allowed for the compilation of the papers and the dissemination of the journal to policy makers, state attorneys general, district and city attorneys, law enforcement officers, chief probation officers, judges, prevention advocates, and researchers.*

EVALUATION REVIEW, Vol. 30 No. 3, June 2006 229-236
DOI: 10.1177/0193841X06287220

Violence against Women Act of 1994, Public Law 103-322, §108 Stat. 1902 (1994).
Wiebe, D. J. 2003. Homicide and suicide risks associated with firearms in the home: A national case-control study. *Annals of Emergency Medicine* 41 (6): 771-82.

Katherine A. Vittes is a doctoral student at the University of California, Los Angeles, School of Public Health. Her primary area of interest is research on firearms policy.

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GUN POSSESSION AMONG MASSACHUSETTS BATTERER INTERVENTION PROGRAM ENROLLEES

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Batterers with access to firearms present a serious lethal threat to their partners. The purpose of this exploratory study is to estimate the prevalence of and risk markers for gun possession among Massachusetts men enrolled in batterer intervention programs. The authors found that 1.8% of the men reported having a gun in or around their home. Those most likely to report having a gun were White, earned $25,000 or more per year, had served in the military, engaged in problem gambling, and had attempted homicide or threatened their partner with a firearm. Recommendations for strengthening relevant gun laws both within and outside of Massachusetts are discussed.

Keywords: *intimate partner violence; firearms; batterer; domestic violence offender*

Intimate partner violence (IPV) accounts for roughly 34% of U.S. femicides (Rennison 2003). Firearms play a significant role in these deaths. Women who are killed by their intimate partners in the United States are more likely to be killed with a gun than by all other methods combined (Durose et al. 2005; Fox and Zawitz 2001). Guns in the hands of physically abusive batterers can escalate nonfatal violence to homicide: When guns are used during domestic or family violence incidents, victims are 12 times more likely to die than during incidents when batterers have no guns (Saltzman et al. 1992). Prior research has found that men's access to guns and weapon-related threat behavior are among the strongest predictors of intimate partner femicide in abusive relationships (Campbell et al. 2003) and that the homes of battered women are more likely than those in the general population to contain a handgun (Sorenson and Wiebe 2004). One previous

EVALUATION REVIEW, Vol. 30 No. 3, June 2006 283-295
DOI: 10.1177/0193841X06287221

study found that 12% of batterers who own guns report using them to threaten their partners (Rothman et al. 2004).

In response to the hundreds of IPV femicides and thousands of nonfatal IPV shootings that happen in the United States each year (Rennison 2003; Wiebe 2003), the U.S. Violent Crime Control Act of 1994, the Gun Control Act of 1968, and the corollary 1996 Lautenberg Amendment make it a federal offense for individuals convicted of qualifying misdemeanor domestic violence crimes, or subject to nontemporary restraining orders, to purchase or possess firearms. Many state legislatures also have enacted laws to restrict batterers' access to firearms. The relationship between the federal and state firearm laws is confusing and thus widely misunderstood. For example, some judges, court officers, and defendants do not realize that even when judges opt not to subject offenders to state-law firearm prohibitions, the offenders may still be required to relinquish their firearms if they have committed a qualifying misdemeanor or are subject to a restraining order that meets the criteria outlined in the federal laws (Mitchell and Carbon 2002).

One potentially problematic aspect of both federal and state firearm laws as they pertain to batterers is that offenders are expected to voluntarily relinquish their weapons to authorities. There are no federal requirements for law enforcement officers to collect firearms from batterers, nor to search for them. Moreover, because many states do not require firearm owners to be licensed and only a few require some form of firearm registration, it is typically impossible for law enforcement officers to research batterers' firearm possession status in a database. For example, in Massachusetts, individuals subject to restraining orders and those convicted of domestic violence crimes may be ordered by judges to surrender their firearms, license to carry firearms, ammunition, and firearms identification cards to the police. However, neither police nor probation officers are required to follow up with the offenders to enforce the order. Moreover, although there is a law in Massachusetts requiring gun owners to register the transfer of guns between licensed individuals with law enforcement (Massachusetts General Law c. 140, §128B), there is no accessible statewide database that can be used by courts, probation officers, or police investigators to determine whether individuals are gun owners when they are arrested or convicted of domestic violence offenses. Although research suggests that state restraining order firearm restriction laws result in 11% fewer femicides per year, inconsistent enforcement makes it difficult to evaluate the laws conclusively (Vigdor and Mercy 2003, 2006 [this issue]).

Given the lethality of armed batterers and problems associated with enforcement of laws restricting batterers' access to firearms, it is important to determine whether and to what extent IPV offenders continue to have access to guns following convictions for IPV crimes or the issuance of restraining orders. Therefore, the aims of this research are to (a) estimate the proportion of male attendees of Massachusetts batterer intervention programs who report having firearms in or around their homes and (b) identify demographic and behavioral risk markers within this group associated with having a gun at home. To our knowledge, this study is the first to investigate the prevalence of gun possession among men convicted of IPV crimes and/or subject to restraining orders.

METHODS

DATA

When offenders are convicted of a domestic violence–related crime in Massachusetts, judges have the option of ordering them to attend a 48-hour-long batterer intervention program. The programs do not function as diversion programs (that is, programs designed to reduce case backlog by providing an alternative to offender involvement in the traditional court system) but offer more intensive and extended monitoring of court-involved offenders than does probation. An estimated 18% of convicted batterers are adjudicated to attend state-certified batterer intervention programs (Bocko et al. 2004). Individuals who are ordered to attend batterer intervention programs (rather than substance abuse programming, anger management, or no program at all) are more likely to have a criminal record and a history of violent offenses (Bocko et al. 2004). Approximately 2,000 unique male clients enter Massachusetts batterer programs each year. Our dataset includes the entire population of individuals entering Massachusetts batterer intervention programs over a recent 3-year period.

All batterer program clients participate in a one-time registration or "intake" session at their respective programs before they begin the group counseling process. During the intake session, batterer intervention program staff administer a paper-and-pencil survey that has 56 questions and takes roughly 20 minutes to complete. Program participants and staff complete the surveys together: In many cases, program participants lack the literacy and/or language skills to complete them independently. Completed surveys do not contain any personally identifying information and are forwarded to the Massachusetts Department of Public Health for entry into a database.

For the purpose of this study, respondent eligibility criteria included (a) being referred to the batterer intervention program as the result of a criminal conviction for a violent crime, stalking or threats against an intimate

partner, and/or being subject to an IPV restraining order at the time of the survey; (b) being male; and (c) answering the survey question about having guns in or around the home either affirmatively or negatively (rather than refusing to answer or responding "I don't know"). Of the 6,127 client records in the dataset with program intake dates between July 1, 2002, and June 30, 2005, 1,425 records were excluded because the clients had not been convicted of a crime or subject to a restraining order, 25 were excluded because the clients were female or their sex was unknown, and 16 were dropped because the clients did not answer the question about the presence of a gun at home.

DATA COLLECTION

To assess the prevalence of guns in the home, batterers were asked a modified version of a question included on the national Behavioral Risk Factor Surveillance Survey in 2001 and 2002: "Are any firearms now kept in or around your home? Include those kept in a garage, outdoor storage area, car, truck, or other motor vehicle" (Centers for Disease Control and Prevention 2005a). Respondents who answered affirmatively may have included firearms not in their own personal possession but kept in the home by their spouse, roommate, or a relative. These individuals may be viewed as having "constructive possession" of a firearm, that is, they could ask for or physically retrieve the firearm and would have the opportunity to use it (Mitchell and Carbon 2002).

Batterers' criminal conviction status was determined through two questions. The first asked if the incident for which they were referred to the batterer program resulted in them being convicted of a crime; it then prompted them to identify crimes of which they had been found guilty. For the purposes of this analysis, the 12 response categories classified as criminal convictions that should disqualify a person from possessing a firearm included violating a domestic violence restraining order, assault and battery, assault with a deadly weapon, aggravated assault, simple assault, kidnapping, criminal threats, stalking, aggravated rape, attempted rape, homicide, and manslaughter. The second question asked clients about the disposition of their criminal case. Response categories were (a) no disposition, continued without a finding or continuance; (b) jail term followed by probation; (c) suspended sentence with probation; (d) straight probation; and (e) not applicable because it was not a criminal case. Respondents who indicated that they had no criminal case, no disposition, that their case was continued without a finding, or that the judge had issued a continuance were excluded from the study sample. Restraining order status was assessed through the following item: "Does the victim have a restraining order in effect now?"

We examined whether a history of problems with alcohol, drugs, or gambling was associated with illegally retaining a firearm. Alcohol and drug abuse histories were assessed via a single, original question: "Do you have a history of alcohol or other drug abuse? (Has substance use kept you from working or going to school, contributed to depression or anxiety, caused you to lose friends, caused liver complications or disturbed sleep patterns?)" Respondents who indicated that they had a history of alcohol problems and/or drug problems were classified accordingly. Problem gambling was assessed through a single question adapted from an item used on at least two state Behavioral Risk Factor Surveillance Surveys in 2001 and 2002: "At any time in your life, would you (or someone in your family) say that the money or time you have spent gambling has led to financial problems or other problems in your family, work or personal life?" (Iowa Department of Public Health 2004; Massachusetts Department of Public Health 2002).

The intake survey assessed history of perpetration of attempted homicide and of threats with a gun to an intimate partner by asking "Have you ever attempted to kill another person?" Gun threats toward intimate partners was assessed by another original question: "Have you ever handled, cleaned, loaded, or displayed a firearm during an argument with a partner or ex-partner?"

We also examined demographic factors, including age, race, level of educational attainment, yearly income, and history of employment with the military. Items assessing demographic information were closed-ended. Respondents who reported that they were employed with the armed forces at the time of the survey, or who said they had been involved in the armed forces at any time in their life, were classified as having a history of military service. All the independent variables were dichotomized into the following categories: age (less than 30 years old vs. 30 years old or older); race (White vs. other); education (high school degree vs. no high school degree); whether the respondent had a history of alcohol or drug abuse, military service, or problem gambling; whether the respondent had ever attempted homicide of any person; and whether the respondent had ever used a gun to threaten an intimate partner.

STATISTICAL ANALYSIS

Frequencies and proportions were calculated. A bivariate generalized linear regression model (GLM) using a log link function and binomial

distribution was used to estimate the prevalence of having a gun in or around the home for individuals with a given characteristic (e.g., military service) relative to individuals without that characteristic. The GLM analysis produced a prevalence ratio (PR), a measure of association that quantifies the relationship between the primary predictor of interest and the outcome (Thompson, Myers, and Kriebel 1998). A prevalence ratio of 1.0 indicates that there is no association between the variables, and the distance of the PR from 1.0 represents the strength of the association between the variables. We computed 95% confidence intervals for the prevalence ratios. Both unadjusted (bivariate) and adjusted (multivariate) prevalence ratios were calculated.

RESULTS

The batterer program attendees (N = 4,701) ranged in age from 17 to 72 years old, with a mean age of 33 years old. Roughly half (54%) described themselves as White, 21% were Black, 12% were Hispanic, and 13% said they were another race. About three quarters (74%) reported at the program intake session that they earned less than $25,000 per year. Ninety-three percent of the men had been referred to the batterer intervention program because they had been convicted of a domestic violence crime (misdemeanor or felony), and 7% had been referred because they were subject to a domestic violence restraining order.

Few (1.8%) of the attendees reported having a gun in or around their home (n = 83) (Table 1). Seven of those who reported having a gun were younger than 21 years old, which is the minimum age for gun ownership in Massachusetts. Those who had previously attempted homicide (PR: 3.17, 95% CI: 1.19-8.41) and who had used a gun to threaten an intimate partner in the past (PR: 9.18, 95% CI: 5.18-16.28) were substantially more likely to report possession of a gun. The bivariate regression analysis also revealed that batterers more likely to have guns in or around their homes had served in the military (PR: 2.16, 95% CI: 1.16-4.02), were White (PR: 3.01, 95% CI: 1.77-5.11), earned $25,000 or more per year (PR: 1.56, 95% CI: 1.00-2.44), and had at some point experienced problem gambling (PR: 2.67, 95% CI: 0.88-8.25) (Table 1). The multivariate analysis revealed that even controlling for other potentially confounding factors, being White or having used a gun to threaten an intimate partner in the past were strongly associated with having a gun in or around the home.

TABLE 1: Factors Associated With Gun Possession Among Men in a Batterer Intervention Program, Massachusetts, 2002-2005

	Convicted Batterers (n)	*Currently Have Gun In or Around House, %*	*Unadjusted Prevalence Ratio (95% Confidence Interval)*	*Adjusted Prevalence Ratio (95% Confidence Interval)*
Overall	4,701	1.8		
Age				
Under 30 years	1,888	1.7	0.93 (0.60-1.45)	1.13 (0.72-1.76)[a]
30 years and older	2,813	1.8		
Race				
White	2,638	2.5	3.01 (1.77-5.11)***	2.81 (1.64-4.82)***,[b]
Non-White	2,043	0.8		
Annual income (individual)				
$25,000 or more	1,202	2.4	1.56 (1.00-2.44)**	1.30 (0.83-2.04)[c]
Less than $25,000	3,499	1.5		
Education				
High school or more	3,005	1.9	1.31 (0.82-2.08)	1.18 (0.74-1.89)[a]
Less than high school	1,696	1.5		
Alcohol abuse history				
Yes	1,611	2.2	1.40 (0.91-2.15)	1.03 (0.66-1.60)[a]
No	3,090	1.6		
Drug abuse history				
Yes	1,074	1.9	1.07 (0.65-1.76)	0.89 (0.53-1.47)[a]
No	3,627	1.7		
Military history				
Yes	311	3.5	2.16 (1.16-4.02)**	1.71 (0.83-2.04)[d]
No	4,390	1.6		
Problem gambling history				
Yes	65	4.6	2.67 (0.88-8.25)*	1.36 (0.47-3.95)[e]
No	4,636	1.7		

(continued)

TABLE 1 (continued)

	Convicted Batterers (n)	Currently Have Gun In or Around House, %	Unadjusted Prevalence Ratio (95% Confidence Interval)	Adjusted Prevalence Ratio (95% Confidence Interval)
Ever attempted homicide				
Yes	74	5.4	3.17 (1.19-8.41)**	1.62 (0.62-4.28)[f]
No	4,627	1.7		
Ever used gun to threaten partner				
Yes	85	14.1	9.18 (5.18-16.28)***	7.76 (4.24-14.20)***[g]
No	4,616	1.5		

a. Adjusted for race, annual income, military history, gambling, ever attempted homicide, and use of gun to threaten partner.
b. Adjusted for annual income, military history, gambling, ever attempted homicide, and use of gun to threaten partner.
c. Adjusted for race, military history, gambling, ever attempted homicide, and use of gun to threaten partner.
d. Adjusted for race, annual income, gambling, ever attempted homicide, and use of gun to threaten partner.
e. Adjusted for race, annual income, military history, ever attempted homicide, and use of gun to threaten partner.
f. Adjusted for race, annual income, military history, gambling, and use of gun to threaten partner.
g. Adjusted for race, annual income, military history, gambling, and ever attempted homicide.
*$p < .10$. **$p < .05$. ***$p < .01$.

DISCUSSION

A total of 1.8% of men enrolled in Massachusetts batterer intervention programs reported having guns in or around their homes. This finding suggests that with some exceptions, Massachusetts gun laws may be successfully restricting batterers' access to firearms. On the other hand, even though the prevalence of gun possession appears low, there is cause for concern because of the lethality of batterers with guns (Campbell et al. 2003). The 1.8% statistic indicates that between 2002 and 2005 there were 83 individual violent offenders in our sample who had access to firearms despite domestic violence convictions or restraining orders. Those who had guns in or around their homes were more likely than batterers who reported no firearm possession to be relatively privileged (White, earn $24,000 or more per year) and to have served in the military. This is consistent with prior research findings that gun owners in general tend to be White and to earn higher incomes (Hemenway 2004).

The batterers who reported gun possession were a dangerous subgroup. They were more likely than other batterers to report that they had attempted homicide; had problems with gambling, drugs, and alcohol; and had used firearms to threaten their partners. These are not men who should have continued access to a firearm, and because each one of them was involved in the criminal justice system, our findings suggest that the existing regulations and procedures were insufficiently enforced in these particular cases.

The present investigation has at least three limitations. First, and perhaps most important, all data were self-reported. Self-report data are subject to potential inaccuracies due to social desirability responses, recall bias, intentional distortions, or noncandid responses (Aday 1996). In particular, respondents may have under- or overreported gun possession and using a gun to threaten a partner. Although we restricted our sample to men who reported that they were convicted of crimes (or subject to restraining orders) who we believe would qualify for the federal prohibition on gun possession, we did not have detailed information about the criminal cases, convictions, or court orders. Thus, it is possible that in some cases respondents were entitled to their firearms according to the federal criteria and state criteria. Second, many of the variables in our study were derived from single-item questions. The validity and reliability of these single-item measures may have affected our ability to correctly classify the study population. Third, the results of this study cannot be generalized to all batterers, nor do they provide an estimate of the prevalence of illegal gun possession among all men convicted of domestic violence offenses or subject to restraining orders. Only a particular subset of domestic violence defendants

are referred to batterer intervention programs, and among those who are referred, only a portion follow through with an initial visit to their assigned program. Furthermore, it is only a particular subset of all domestic violence offenders who are ever charged with crimes.

IMPLICATIONS FOR POLICY AND PRACTICE

In general, Massachusetts has strong gun laws and relatively few gun owners compared to populations of other, particularly Southern and Mountain, states. In fact, in 2001, only 12% of Massachusetts households contained guns (Okoro et al. 2005), and the state had the lowest gun death rate of any in the United States (Centers for Disease Control and Prevention 2005b). It seems likely that the prevalence of illegal gun possession among batterers would be greater in states where the overall prevalence of gun ownership is higher than it is in Massachusetts. Moreover, because relatively few defendants in Massachusetts own guns, judges and probation officers in the state may not regularly emphasize to convicted batterers the requirement that they relinquish their firearms. This study should be replicated in a state where gun ownership is more prevalent.

Even in states where few batterers possess guns, officers of the court and batterer intervention counselors need training about federal and state firearms laws and reminders about the importance of disarming batterers. In 2005 in Massachusetts, new probation officers and batterer program counselors received no training about firearms and IPV (D. Adams, co-founder and co-director of the EMERGE Batterer Intervention Program, personal communication, August 31, 2005; S. Bocko, deputy commissioner, Massachusetts Office of the Commissioner of Probation, personal communication, August 29, 2005). Probation officers and batterer program counselors in all U.S. states should receive accurate and clear information about whether offenders they supervise are permitted to purchase or possess firearms and the importance of surrendering probationers who violate the law to the court. The counselors and probation officers should also be provided with best practice guidelines for screening offenders for firearm possession and counseling them to relinquish their guns. Similarly, battered women's advocates, mental health clinicians, emergency room physicians and nurses, and others who regularly come into contact with victims of IPV should receive training about firearm restrictions and under what conditions they should counsel victims to report illegal gun possession by batterers to law enforcement.

Existing firearm restriction laws depend heavily on batterers' willingness and ability to relinquish guns to the police pursuant to their conviction or

issuance of a restraining order. The prevalence of lifetime alcohol abuse (34%), drug addiction (23%), and mental health disorder diagnoses (22%)—all characteristics related to other categories of prohibited purchasers—reported by batterers in our sample calls into question whether the practice of relying upon IPV offenders to comply with domestic violence gun ban restrictions of their own accord is likely to be effective. Judges, probation officers, and batterer intervention counselors can take several steps to improve the likelihood that batterers will comply with court orders to relinquish firearms. As outlined by Mitchell and Carbon (2002), judges can obtain from defendants, under oath, a list of the firearms in their possession. Second, judges, probation officers, and batterer intervention counselors can all notify defendants of their obligation to relinquish firearms and reinforce to them the penalties for failing to do so. Third, judges can think broadly about what constitutes constructive possession and can collaborate with assistant U.S. federal attorneys and agents of the Bureau of Alcohol, Tobacco and Firearms, who can advise defendants' relatives of the federal laws that prohibit granting possession of firearms to batterers. Fourth, the court can monitor batterers' compliance with court orders to relinquish firearms by requiring an accounting to the court of the firearms removed. If a full accounting is not made, law enforcement can search defendants' homes for the weapons and defendants can be arrested for failing to comply with the court order. Finally, batterer intervention program counselors can prepare handouts and instructions for batterers and take time out of group counseling sessions to explain in detail the process for relinquishing firearms when necessary.

Currently, authorities have no way to determine if convicted batterers or those subject to restraining orders are in possession of firearms other than to ask them directly. A centralized U.S. firearm registry system that contained data on every firearm and firearm owner in the United States, like the national firearm registry system that exists in Canada, could likely significantly enhance law enforcement's capacity to determine which IPV offenders have guns, how many they have, and whether federal and state firearm restrictions for batterers are being upheld.

CONCLUSION

A small percentage of batterers enrolled in Massachusetts batterer intervention programs reported that there was a gun in or around their homes. Our study was not an evaluation of Massachusetts laws; however, our findings

suggest that the state's gun control laws may be an important component of a successful approach to reducing batterers' access to firearms. An evaluation that compares gun possession among batterers across states with different types of restrictions would benefit the field.

The minority of batterers who retained their firearms in Massachusetts were a dangerous subgroup. They were more likely to report that they had attempted homicide and that they had threatened their partners with guns. We, therefore, recommend that batterer intervention counselors and probation officers in Massachusetts and other states receive training about firearms restrictions that pertain to batterers and that battered women's and gun-safety advocates in Massachusetts and elsewhere continue to work with criminal justice personnel and others to close loopholes in the enforcement of existing laws.

REFERENCES

Aday, L. 1996. *Designing and conducting health surveys*. San Francisco, CA: Jossey-Bass.

Bocko, S., C. Cicchetto, L. Lempicki, and A. Powell. 2004. *Restraining order violators, corrective programming and recidivism*. Boston, MA: Massachusetts Trial Court, Office of the Commissioner of Probation.

Campbell, J. C., D. Webster, J. Koziol-McLain, C. Block, D. Campbell, M. A. Curry, F. Gary, N. Glass, J. McFarlane, C. Sachs, P. Sharps, Y. Ulrich, S. A. Wilt, J. Manganello, X. Xu, J. Schollenberger, V. Frye, and K. Laughon. 2003. Risk factors for femicide in abusive relationships: Results from a multisite case control study. *American Journal of Public Health* 93:1089-97.

Centers for Disease Control and Prevention. 2005a. *Behavioral Risk Factor Surveillance System historical questions results*. http://apps.nccd.cdc.gov/brfssQuest (accessed August 31, 2005).

———. 2005b. *Web-based Injury Statistics Query and Reporting System (WISQARS)*. www.cdc.gov/ncipc/wisqars (accessed August 29, 2005).

Durose, M., C. Harlow, P. Langan, M. Motivans, R. Rantala, and E. Smith. 2005. *Family violence statistics* (NCJ 207846). Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.

Fox, J., and M. Zawitz. 2001. *Homicide trends in the United States*. http://www.ojp.usdoj.gov/bjs (accessed September 21, 2003).

Hemenway, D. 2004. *Private guns, public health*. Ann Arbor: University of Michigan Press.

Iowa Department of Public Health. 2004. *Annual report, survey results from the 2003 Iowa BRFSS*. Des Moines: Bureau of Health Statistics, Iowa Department of Public Health.

Massachusetts Department of Public Health. 2002. *Alcohol use, illicit drug use, and gambling in Massachusetts*. Boston, MA: Health Survey Program, Center for Health Information, Statistics, Research, and Evaluation, Massachusetts Department of Public Health.

Mitchell, D., and S. Carbon. 2002. Firearms and domestic violence: A primer for judges. *Court Review* 39:32-43.

Okoro, C., D. Nelson, J. Mercy, L. Balluz, A. Crosby, and A. Mokdad. 2005. Prevalence of household firearms and firearm-storage practices in the 50 states and the District of Columbia: Findings from the Behavioral Risk Factor Surveillance System, 2002. *Pediatrics* 116:370-6.

Rennison, C. 2003. *Intimate partner violence, 1993-2001* (NCJ 197838). Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics.

Rothman, E., D. Hemenway, M. Miller, and D. Azrael. 2004. Batterers' use of guns to threaten intimate partners. *Journal of the American Medical Women's Association* 60:62-8.

Saltzman, L. E., J. A. Mercy, P. W. O'Carroll, M. L. Rosenberg, and P. H. Rhodes. 1992. Weapon involvement and injury outcomes in family and intimate assaults. *Journal of the American Medical Association* 267:3043-7.

Sorenson, S. B., and D. J. Wiebe. 2004. Weapons in the lives of battered women. *American Journal of Public Health* 94:1412-7.

Thompson, M., J. Myers, and D. Kriebel. 1998. Prevalence odds ratio or prevalence ratio in the analysis of cross sectional data: What is to be done? *Occupational and Environmental Medicine* 55:272-7.

Vigdor, E., and J. Mercy. 2003. Disarming batterers: The impact of domestic violence firearm laws. In *Evaluating gun policy: Effects on crime and violence*, edited by J. Ludwig and P. Cook, 157-201. Washington, DC: Brookings Institution.

———. 2006. Do laws restricting access to firearms by domestic violence offenders prevent intimate partner homicide? *Evaluation Review* 30:313-346.

Wiebe, D. 2003. Sex differences in the perpetrator-victim relationship among emergency department patients presenting with non-fatal firearm-related injuries. *Annals of Emergency Medicine* 42:405-12.

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