



## Original Contribution

# Analysis of the Strength of Legal Firearms Restrictions for Perpetrators of Domestic Violence and Their Associations With Intimate Partner Homicide

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In this research, we estimate the association of firearm restrictions for domestic violence offenders with intimate partner homicides (IPHs) on the basis of the strength of the policies. We posit that the association of firearm laws with IPHs depends on the following characteristics of the laws: 1) breadth of coverage of high-risk individuals and situations restricted; 2) power to compel firearm surrender or removal from persons prohibited from having firearms; and 3) systems of accountability that prevent those prohibited from doing so from obtaining guns. We conducted a quantitative policy evaluation using annual state-level data from 1980 through 2013 for 45 US states. Based on the results of a series of robust, negative binomial regression models with state fixed effects, domestic violence restraining order firearm-prohibition laws are associated with 10% reductions in IPH. Statistically significant protective associations were evident only when restraining order prohibitions covered dating partners (–13%) and ex parte orders (–13%) and included relinquishment provisions (–12%). Laws prohibiting access to those convicted of nonspecific violent misdemeanors were associated with a 23% reduction in IPH rates; there was no association when prohibitions were limited to domestic violence. These findings should inform policymakers considering laws to maximize protections against IPH.

domestic violence; firearms; homicide; policy analyses

Abbreviations: CI, confidence interval; DVRO, domestic violence restraining order; IPH, intimate partner homicide; IRR, incidence rate ratio; MCDV, misdemeanor crimes of domestic violence.

Over the past 30 years, many states, with a goal of preventing intimate partner homicide (IPH), have enacted laws to prevent domestic violence offenders from accessing firearms. The rationale behind these laws is consistent with study results indicating a 5-fold increased risk of homicide when a violent intimate partner has access to a firearm (1). There has been great variation across states and over time in firearm policies relevant to IPH risk concerning the breadth of prohibiting conditions and in the level of authority given to courts and law enforcement to recover firearms from individuals prohibited from having them.

In the present study, we investigated whether firearm restrictions for domestic violence offenders are associated with IPH levels. There are various types of statutes that may limit a domestic violence offender's access to firearms. One common state statute restricts access for persons subject to certain domestic violence restraining orders (DVROs). Federal law prohibits the purchase

or possession of firearms by individuals under final DVROs if the respondent is the current or former spouse, has a child with, or ever lived with the petitioner. Many states have enacted similar restrictions (some before the federal restriction went in effect) and some states extend the restrictions in federal law to those in dating relationships with victims and/or individuals under ex parte orders. Ex parte orders, also called temporary or emergency orders, apply before a court hearing that the respondent had the opportunity to attend. Despite these restrictions on firearm possession, many state laws do not specify requirements for firearm relinquishment or provide explicit authority for law enforcement seizure of firearms (2).

Federal law and some state laws prohibit persons convicted of misdemeanor crimes of domestic violence (MCDV) from accessing firearms. In addition, some states extend firearm prohibitions to individuals convicted of violent misdemeanors (with

varying degrees of specificity). Such prohibitions are usually time limited. Many domestic violence offenders are not convicted of crimes of domestic violence but often have criminal histories that include violent crimes other than domestic violence (3). Therefore, firearm restrictions for violent misdemeanor convictions not exclusive to domestic violence would prohibit a large group of domestic violence offenders from obtaining firearms.

In a few states, convictions for misdemeanor stalking are an additional firearms prohibitor relevant to domestic violence offenders. In addition, many states have felony stalking crimes that domestic violence offenders may be charged under, which would also prohibit them from accessing firearms. Finally, laws that authorize law enforcement to remove firearms from the scene of domestic violence incidents exist in some states; however, the criteria for removal vary widely among states (4).

Legal restrictions on firearm purchase are enforced, in part, through the federal requirement that firearm sales by licensed dealers be contingent upon purchasers passing a criminal background check. But federal law does not require background checks for firearm transfers by nonlicensed private sellers, nor is this a requirement in most states. This provides an avenue by which those prohibited from accessing firearms may acquire guns. Some states have universal background check laws that govern private sales by making prospective purchasers go to a licensed gun dealer who submits the background check application to law enforcement officials who, in turn, check the purchaser's criminal history. Other states have permit-to-purchase licensing laws that require prospective purchasers to apply for a permit from law enforcement agencies that initiate background checks and verify other requirements are met, such as safety training (5). One additional state variation in background check procedures is that some states, referred to as points-of-contact states, require the use of their own databases to identify persons prohibited from accessing firearms in addition to the Federal Bureau of Investigation's National Instant Criminal Background Check System, potentially locating disqualifying records not in the national system.

In ecological studies of the association of firearm laws with IPH, state DVRO firearm restrictions were associated with an 8% reduction in IPH rates (6); in a recent study, researchers reported that only states that specified the relinquishment of firearms already possessed in the DVRO law experienced associated reductions of approximately 10% (7). In a study of large US cities, the association of DVRO laws with reduced IPH rates (-19%) was greater than that found in state-level studies (8). MCDV firearm restrictions and laws on confiscating firearms at the scene of domestic violence have not been found, thus far, to be associated with IPH rates (6-9).

## METHODS

This research advances the field by estimating the association of IPH with the following: potentially important yet unstudied expansions of the DVRO firearm restrictions, firearms laws not specific to domestic violence that may restrict domestic violence offenders' firearm access, and firearm laws for, to our knowledge, the longest period of any published study (34 years). On the basis of our findings, we considered temporal trends long

before most of the laws were first introduced and estimated the laws' effects over longer periods than they have been in place. We tested 3 main hypotheses.

### Hypothesis 1

Our first hypotheses was as follows: Firearm restrictions that include a broader set of domestic violence offenders are associated with larger reductions in IPH. Specifically, DVRO laws that extend firearm prohibitions to ex parte DVROs and situations involving dating relationships are associated with greater reductions in IPH than are weaker DVRO gun laws. Similarly, firearm prohibitions that cover violent misdemeanors convictions regardless of the victim-offender relationship are associated with greater reductions in IPH than laws that only prohibit firearms when someone is convicted of domestic violence.

### Hypothesis 2

According to our second hypotheses, laws that explicitly require relinquishment of firearms or grant law enforcement authority to remove firearms from domestic violence offenders prohibited from having them are associated with larger reductions in IPH than when enforcement is not addressed in statutory language.

### Hypothesis 3

Our third hypothesis was as follows: Laws establishing systems of accountability for transferring guns to persons prohibited from accessing firearms, specifically permit-to-purchase laws, universal background check laws, and point-of-contact background check systems, are associated with reductions in IPH.

## Design and Data Sources

We conducted a pooled, cross-sectional, time-series analysis using annual state-level data from 1980 through 2013. We analyzed the data using generalized estimating equations with a negative binomial distribution and state fixed effects. We used 2 dependent variables: the count of IPH victims aged 14 years and older and a subset of those who were killed with a firearm. These data were obtained from the Federal Bureau of Investigation's Supplementary Homicide Reports—part of the larger Uniform Crime Reports system—to which local law enforcement agencies voluntarily submit incident-specific information on homicides, such as demographic and relationship data on the victim and suspect, and method of homicide.

The Supplementary Homicide Reports data set has multiple limitations, including that not all jurisdictions submit their homicide data every year. Because of failure to report several years of data, we excluded from our analysis Florida, Kansas, Kentucky, Montana, and Nebraska. In addition, some data on reported homicides may be missing (10). To guard against these limitations, we used a multiply imputed Supplementary Homicide Reports data set developed by James Fox (James Fox, Northeastern University, unpublished data, 2015). We pooled the item-imputed data and weighted it at the state level to match

the total homicides identified in a given state-year based on the more complete Crime in the United States report (11) from the Uniform Crime Reports totals. When a state reported less than one-third of its estimated homicides, it was dropped, resulting in the exclusion of 23 state-years (1.5%). As a sensitivity test, we also ran the analysis on the raw Supplementary Homicide Reports data and obtained similar results regarding the direction and magnitude of the incidence rate ratios (see Web Table 1, available at <https://academic.oup.com/aje>). In general, however, confidence intervals were wider with the unweighted data, suggesting decreased precision of estimates, and, in few cases, *P* values switched to greater than 0.05.

We included the following state-level statutes (which are defined in footnotes to Web Tables 2 and 3): DVRO firearm restrictions (i.e., any; covers dating partners; includes ex parte orders; has accompanying firearm relinquishment provision); restrictions for those convicted of violent misdemeanor crimes (i.e., only domestic; includes nondomestic); prohibitions for individuals convicted of stalking (i.e., felony stalking; misdemeanor stalking); laws authorizing law enforcement to remove firearms from the scene of domestic violence; permit-to-purchase laws; universal background check laws; and point-of-contact background check policies. We also included federal DVRO and MCDV firearm restrictions in the analyses.

Legal research was conducted to determine which states enacted which laws and their implementation dates. State statutes were retrieved from the Westlaw legal database (Thomson Reuters, Eagan, Minnesota) and analyzed. Implementation dates were determined from a statute's session laws, available in the WestlawNext database (Thomson Reuters) with legislative history available from LexisNexis (LexisNexis Group, New York, New York), HeinOnline (William S. Hein & Co., Buffalo, New York), and state-specific databases. Binary indicator variables reflected whether a law was in place in a given state-year provided the law had been in place for at least 6 months of that year. We lagged law variables by 1 year in the models to reflect the time it takes to implement a law.

Several control variables associated with IPH rates were included in our statistical models. These included the percentage of the population identified as black (12, 13), the percentage of the population that was married and divorced (separately) (13–16), and the ratio of women aged 25 years or older who had a college education to men in the same cohort (8, 13, 17). These data were obtained from the US Census and interpolated for intercensal years (17–20). Economic indicators (13) were also controlled for, including the percentage of the population below the poverty level (21); the level of monetary aid, adjusted for inflation to year 2000 dollars, to low-income families of 4 through Aid to Families with Dependent Children/Temporary Assistance to Needy Families (22); and unemployment levels (23).

Our models also controlled for the number of police officers per 100,000 population (8), obtained from the annual Uniform Crime Reports from 1979 through 2013 (11). Because the number of police officers is measured on October 1 each year, we lagged the measure by 1 year. From the Supplementary Homicide Reports, we also included the rate of nonintimate partner homicides for adults aged 25 years and older to control for general homicide trends in the states over time. We used a 5-year rolling average of the percentage of suicides committed with firearms as

a proxy for the prevalence of firearm ownership (24, 25). Last, we obtained the amount of funding each state received, by year, from the federal STOP Violence Against Women Grant Program (26). Because these funds are used in numerous ways to protect women (e.g., improving law enforcement response to domestic violence, providing funding for victims' services agencies), it is plausible that they affect IPH.

## Analysis

We used generalized estimating equations with a negative binomial distribution, robust standard errors specifying that intragroup correlation may occur by state, and state fixed effects. Our offset variable was the natural log of the count of the population aged 14 years and older in the state-year. Each model included linear and quadratic year trend terms. All models were estimated in Stata, version 14.2 (StataCorp, College Station, Texas) and 2-sided tests of significance were used (27).

## RESULTS

There was a range of 16–29 states that adopted each of the domestic violence firearm restriction laws during the study period, 2–24 states that adopted laws related to implementation of purchase restrictions, and 11 states that adopted laws mandating firearm removal from the scene of domestic violence (see Web Tables 2 and 3). Any state DVRO prohibition was associated with a reduction in total IPH (incident rate ratio (IRR) = 0.90, 95% confidence interval (CI): 0.83, 0.97) and firearm IPH (IRR = 0.87, 95% CI: 0.78, 0.97) (Table 1). Violent misdemeanor prohibition laws were also associated with a reduction in total IPH (IRR = 0.77, 95% CI: 0.66, 0.91) and firearm IPH (IRR = 0.79, 95% CI: 0.63, 0.98); however, there was a statistically significant increase in IPH (IRR = 1.16, 95% CI: 1.04, 1.30) for firearm prohibitions exclusive to stalking misdemeanants.

Table 2 presents the results from the models that tested the associations of differing provisions of DVRO firearm restrictions with IPH. Compared with states with no DVRO firearm restrictions, states that included dating partners in their DVRO policy experienced an associated reduction in total IPH (IRR = 0.87, 95% CI: 0.80, 0.95) and firearm IPH (IRR = 0.84, 95% CI: 0.74, 0.95), whereas no significant association was found when a state did not cover dating partners. DVRO firearm restriction laws that included ex parte orders were associated with a decrease in total IPH (IRR = 0.87, 95% CI: 0.77, 0.98) and firearm IPH (IRR = 0.84, 95% CI: 0.71, 0.99). Laws that did not cover ex parte orders were not associated with IPH or firearm IPH. DVRO firearm relinquishment provisions were significantly associated with a decrease in IPH (IRR = 0.88, 95% CI: 0.81, 0.97) and firearm IPH rates (IRR = 0.84, 95% CI: 0.74, 0.96), but DVRO firearm restrictions without relinquishment provisions were not associated with IPH or firearm IPH.

## DISCUSSION

This research was a comprehensive examination of the associations of laws designed to prevent domestic violence

**Table 1.** Associations Between Selected Firearm Laws and Intimate Partner Homicide in 45 US States, 1980–2013<sup>a</sup>

Law	Intimate Partner Homicide			Firearm Intimate Partner Homicide		
	IRR	95% CI	P Value	IRR	95% CI	P Value
Firearm restriction laws						
State DVRO	0.90	0.83, 0.97	0.009	0.87	0.78, 0.97	0.013
State MCDV	1.08	0.92, 1.27	0.331	1.13	0.94, 1.35	0.182
Violent misdemeanor	0.77	0.66, 0.91	0.002	0.79	0.63, 0.98	0.029
Stalking misdemeanor	1.16	1.04, 1.30	0.010	1.11	0.96, 1.29	0.161
Stalking felony	1.01	0.92, 1.11	0.854	0.98	0.86, 1.11	0.713
Federal DVRO	0.95	0.88, 1.03	0.206	0.99	0.91, 1.08	0.865
Federal MCDV	0.94	0.88, 1.01	0.085	0.91	0.84, 0.99	0.033
Purchase restriction implementation laws						
Permit to purchase	1.04	0.85, 1.28	0.680	1.06	0.83, 1.37	0.627
Background check	1.07	0.94, 1.21	0.288	1.13	0.94, 1.35	0.198
Point-of-contact state	0.98	0.91, 1.07	0.685	1.00	0.90, 1.11	0.956
Firearm confiscation from scene	0.95	0.85, 1.06	0.384	0.95	0.81, 1.10	0.478

Abbreviations: CI, confidence interval; DVRO, domestic violence restraining order; IRR, incidence rate ratio; MCDV, misdemeanor crime of domestic violence.

<sup>a</sup> Other factors controlled for were arrest laws for domestic violence; the percentages of the population divorced, married, and in poverty; average Temporary Assistance for Needy Families benefits for a family of 4; educational ratio of women to men; a 5-year rolling average of the percentage of suicides committed with firearms; the nondomestic violence homicide rate for adults aged 25 years and older; the ratio of full-time police officers to population; Violence Against Women Act STOP grant funding; state fixed effects; and a quadratic time trend.

offenders from accessing firearms with IPH rates at the state level over a 34-year study period. Our findings are consistent with those of prior studies showing protective effects of firearm restrictions for DVRO respondents in reducing IPHs

(6, 8, 9). Indeed, the point estimates for this research and that of Vigdor and Mercy (6) are remarkably similar, at a 10% or 8% reduction in IPH at the state level in association with DVRO gun restriction laws, respectively.

**Table 2.** Associations Between Provisions of State Domestic Violence Restraining Order Firearm Restrictions and Intimate Partner Homicide in 45 US States, 1980–2013<sup>a</sup>

Law	Intimate Partner Homicide			Firearm Intimate Partner Homicide		
	IRR	95% CI	P Value	IRR	95% CI	P Value
Inclusion of dating partners						
No DVRO restriction	1.00	Referent		1.00	Referent	
DVRO restriction does not include dating partners	0.94	0.87, 1.03	0.178	0.92	0.82, 1.02	0.116
Dating partners included	0.87	0.80, 0.95	0.003	0.84	0.74, 0.95	0.006
Inclusion of ex parte DVROs						
No DVRO restriction	1.00	Referent		1.00	Referent	
DVRO restrictions do not cover ex parte orders	0.97	0.88, 1.07	0.543	0.95	0.84, 1.07	0.408
Ex parte orders covered	0.87	0.77, 0.98	0.025	0.84	0.71, 0.99	0.043
Inclusion of relinquishment law						
No DVRO restriction	1.00	Referent		1.00	Referent	
DVRO restriction without relinquishment law	0.93	0.85, 1.01	0.083	0.92	0.82, 1.03	0.143
Relinquishment law included	0.88	0.81, 0.97	0.008	0.84	0.74, 0.96	0.008

Abbreviations: CI, confidence interval; DVRO domestic violence restraining order; IRR, incidence rate ratio.

<sup>a</sup> Each of the 6 models controlled for all other firearm laws; arrest laws for domestic violence; the percentages of the population divorced, married, and in poverty; average Temporary Assistance for Needy Families benefits for a family of 4; educational ratio of women to men; a 5-year rolling average of the percentage of suicides committed with firearms; the nondomestic violence homicide rate for adults aged 25 years and older; the ratio of full-time police officers to population; Violence Against Women Act STOP grant funding; state fixed effects; and a quadratic time trend.

In this study, we went beyond prior research by estimating the association of IPH rates with specific provisions of DVRO firearm restriction laws, firearm restrictions resulting from convictions for violent misdemeanors not exclusive to domestic violence, and laws to prevent illegal acquisition of firearms (e.g., permit-to-purchase laws). The findings generally support our hypothesis that laws restricting firearms from a broader population of individuals who commit domestic violence are more effective at reducing IPHs than are more narrow laws. Specifically, DVRO firearm restrictions that cover dating partners, who constituted almost half of all IPH offenders in 2013 (28), were linked with a 13% reduction in IPH rates, compared with an estimated 6% reduction in IPH rates for such laws that exclude dating partners, with a confidence interval indicating no clear association. Ex parte DVRO firearm restrictions were associated with a 13% reduction in IPHs and a 16% reduction in firearm IPHs. Firearm restrictions limited to final DVROs were linked to a 3% reduction in IPHs relative to having no such laws; however, again the confidence interval indicated no clear association.

Consistent with prior research, the results of our main models indicate laws restricting access to firearms by those convicted of MCDV were not associated with IPH (6, 8, 9). However, laws restricting those convicted of violent misdemeanor crimes, regardless of the relationship between the offender and victim, were estimated to reduce IPH by 23% and firearm IPH by 21%. Although, to the best of our knowledge, domestic violence outcomes have not been assessed in association with this law, in a study of violent misdemeanants in California who sought to purchase handguns just before and just after California passed this type of law, researchers found that denial of legal handgun purchase was associated with lower risk for subsequent offending involving violence and/or guns (29).

There are several reasons why the broader violent misdemeanor prohibition may convey more protection than prohibitions focused on MCDV. First, the law affects those domestic violence offenders who were convicted of either domestic or nondomestic violent crimes and thereby disarms more violent offenders. Second, the purchase prohibition may be simpler to implement for violent misdemeanors generally than for MCDV. Many states do not have a misdemeanor crime statute that covers all or only violent crimes involving intimate partners. This may increase the difficulty of ensuring that all qualifying MCDV are flagged and included in criminal background checks. When violent misdemeanors are broadly covered, the uncertainty associated with identifying which convictions include intimate relationships is removed. People disqualified in this way may be more effectively prohibited from purchasing firearms.

Our results failed to provide support for our hypothesis that systems designed to prevent the transfer of guns to persons prohibited from having firearms are associated with reductions in IPH. There is mounting evidence, however, that laws requiring prospective firearm purchasers to pass a background check vetted directly by law enforcement under permit-to-purchase licensing laws reduce the diversion of guns to criminals (30, 31). Findings from studies of Missouri's repeal and Connecticut's adoption of a permit-to-purchase law suggest that they reduce homicides (32, 33). Permit-to-purchase laws

often require a prospective gun buyer to apply for a permit directly from law enforcement regardless of whether they want to purchase from a licensed dealer or private seller. This may discourage those prohibited from attempting to purchase firearms and increase the likelihood of being denied a sale.

Possession of firearms already owned before a disqualifying event is arguably more difficult to prevent than new firearm purchases. Firearm relinquishment provisions for those disqualified because of DVROs are one way to promote dispossession. Support was found for our hypothesis that laws explicitly requiring surrender or granting law enforcement authority to remove firearms are associated with larger reductions in IPH than when enforcement is not addressed in the law. Compared with state-years without DVRO restrictions, presence of a DVRO firearm relinquishment law was associated with a 12% reduction in IPH, whereas there was no clear effect of DVRO laws without relinquishment provisions. Firearm relinquishment may be a critical part of firearm violence reduction strategies for domestic violence, when evaluated on the basis of our study results, paired with the results of recent research in which an associated reduction in IPH and firearm IPH in the presence of DVRO laws with relinquishment provisions (7) also was found. However, it is documented in published literature that relinquishment may not occur just because it is ordered (34), and that law enforcement efforts to assure implementation and enforcement of dispossession ordered by the court can be done effectively (35). There may be greater protective effects to be gained with better implementation.

## Limitations

This research is similar to other policy evaluations in that we did not measure policy implementation or enforcement. It is likely that some states or local jurisdictions have taken steps to enforce the law and ensure that those restricted from purchase and possession do not have guns, whereas other jurisdictions may make no such effort. Attempts were made to develop proxies for implementation and enforcement, but these proved unfruitful.

Another limitation of this research is that we may not have adequately controlled for confounding influences. Although an interrupted time-series design with varying interruption points by state would require any confounders to act at the same times in the same states as the policies under study, this may still have occurred. Legislators often enact a host of laws about a topic at once. With our focus on firearm policy, we may have omitted nonfirearm programs or policies that may have improved safety for victims of domestic violence. We suspect that our contrary result regarding stalking misdemeanor firearm restriction laws is because these laws have been passed during times of increasing intimate partner violence problems but are hard to enforce. In addition, although we controlled for temporal trends across states, we did not control for within-state time trends in our analysis. It is possible that state-specific secular trends in IPH could vary and confound our estimates. We opted to exclude linear and quadratic state-specific time trends from our analysis, however, because adding so many parameters to our models would overfit the data.

## Conclusion

Data to inform and guide firearm policy discussions at the local, state, and national levels are needed to improve public safety. The results of our research are consistent with previous findings that DVRO firearm restriction laws are associated with decreases in IPH, and add to the body of literature new findings on the importance of specific DVRO provisions and on multiple additional firearm policies. Questions for future research, based on our findings, include whether violent misdemeanor firearm restriction laws are associated with reductions in nonintimate partner homicides. Future research should also be focused on implementation of the laws under study, particularly with a focus on providing roadmaps for greater implementation.

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