

**Analysis of the Strength of Legal Firearms Restrictions for Perpetrators of
Domestic Violence and their Impact on Intimate Partner Homicide**

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ABSTRACT

In this research, we estimate the association of firearm restrictions for domestic violence offenders with intimate partner homicides (IPHs), based on the strength of the policies. We posit that the impact of firearm laws on IPHs depends on the laws': 1) breadth of coverage of high-risk individuals and situations restricted; 2) power to compel firearm surrender or removal from prohibited persons; and 3) systems of accountability that prevent prohibited persons from obtaining guns. We conducted a quantitative policy evaluation using annual state-level data from 1980 through 2013 for 45 U.S. 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 9% reductions in IPH. Statistically significant protective associations were evident only when restraining order prohibitions covered dating partners (-10%) and ex parte orders (-12%). Laws prohibiting access to those convicted of non-specific violent misdemeanors were associated with a 23% reduction in IPH rates; there was no association when prohibitions were limited to domestic violence. Permit-to-purchase laws were associated with 11% reductions in IPHs. These findings should inform policymakers considering laws to maximize protections against intimate partner homicide.

Keywords: Firearms; homicide; domestic violence; policy analyses

Abbreviations: Confidence interval (CI); Domestic violence restraining order (DVRO);

Incidence rate ratio (IRR); Intimate partner homicide (IPH); Misdemeanor crime of domestic violence (MCDV)

Over the past 30 years, many states have enacted laws to prevent domestic violence offenders from accessing firearms with a goal of preventing intimate partner homicides (IPH). The rationale behind these laws is consistent with research showing 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 prohibited individuals.

This research investigates whether firearm restrictions for domestic violence offenders are associated with IPH levels. There are multiple 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 for 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. Additionally, 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.

Convictions for misdemeanor stalking are an additional firearms prohibitor relevant to domestic violence offenders in place in a minority of states. Additionally, 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 non-licensed private sellers, nor is this a requirement in most states. This provides an avenue for prohibited persons to 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 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 who 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 prohibited persons in

addition to the Federal Bureau of Investigation's National Instant Criminal Background Check System, potentially locating disqualifying records that are not in the national system.

Ecological studies of the association of firearm laws with IPH have found that state DVRO firearm restrictions were associated with an 8% reduction in IPH rates,⁶ with one recent study finding that only states that specified for the relinquishment of firearms already possessed in the DVRO law experienced associated reductions of roughly 10%.⁷ A study of large US cities found the DVRO laws' association with reduced IPH rates (-19%) was larger than in the state-level studies.⁸ MCDV firearm restrictions and laws on confiscating firearms on the scene of domestic violence have thus far been found to not be associated with IPH rates.⁶⁻⁹

This research advances the field in multiple ways by: 1) estimating the association between potentially important yet unstudied expansions of the DVRO firearm restrictions with IPH; 2) estimating the association of firearms laws not specific to domestic violence that may restrict domestic violence offenders' firearm access; and 3) estimating associations between firearm laws and IPH for the longest period of any study yet published (34 years), allowing us to both consider temporal trends long before most of the laws were first introduced and to estimate the laws' effects over longer periods that they have been in place. We test three main hypotheses:

H1: 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 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.

H2: Laws that explicitly require relinquishment of firearms or grant law enforcement authority to remove firearms from prohibited domestic violence offenders are associated with larger reductions in IPH than when enforcement is not addressed in statutory language.

H3: Laws establishing systems of accountability for transferring guns to prohibited persons, specifically permit to purchase laws, universal background check laws, and point of contact background check systems, are associated with reductions in IPH.

METHODS

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 employed two 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 FBI'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 dataset has multiple limitations, including that not all jurisdictions submit their homicide data every year. Because of failure to report several years of data, our analysis excludes Florida, Kansas, Kentucky, Montana, and Nebraska. Additionally, some data on reported homicides may be missing.¹⁰ To guard against these limitations, we employed a multiply-imputed Supplementary Homicide Reports dataset developed by Fox.¹¹ 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 from the Uniform Crime Reports totals. Twenty-three (1.5% of) state-years were dropped when a state reported less than one-third of its estimated homicides. 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). 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 .05.

We included the following state-level statutes (which are defined in footnotes to Web Tables 2 and 3): DVRO firearm restrictions (any, covers dating partners, includes ex parte orders, has accompanying firearm relinquishment provision); restrictions for those convicted of violent misdemeanor crimes (only domestic, includes non-domestic); prohibitions for individuals convicted of stalking (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 Westlaw legal database and analyzed. Implementation dates were determined from a statute's session laws, available on the WestlawNext database with legislative history available from LexisNexis, HeinOnline, 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 one year in the models to reflect the time it takes to implement a law.

Multiple control variables associated with IPH rates were included in our statistical models. These included the percent 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 to men aged 25 years and older with a college education.^{8,13,17} These data were obtained from the United States Census and interpolated for intercensal years.¹⁸⁻²⁰ Economic indicators¹³ were also controlled for, including the percent 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 four 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. Because the number of police officers is measured on October 1st of each year, we lagged the measure by one year. From the Supplementary Homicide Reports, we also included the rate of non-intimate partner homicides for adults aged 25 years and older to control for general homicide trends in the states over time. We used a five-year rolling average of the percentage of suicides committed with firearms as a proxy for the prevalence of firearm ownership.^{24,25} Lastly, we obtained the amount of funding each state received, by year, from the federal STOP Violence Against Women Grant Program. 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 impact 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 v14.2 and two-sided tests of significance were used.²⁶

To test whether the presence of both laws designed to prevent prohibited persons from obtaining guns and DVRO firearm restrictions resulted in greater reductions in IPH than each law alone, we ran an additive interaction analysis of permit-to-purchase laws with DVRO firearm restrictions. We must, however, caution that while 9 states have both laws, there is a lack of variation in which law was introduced first (only one state had the DVRO firearm restriction first), therefore limiting the inferences that can be made from these models.

RESULTS

There was a range of 16 to 29 states that adopted each of the domestic violence firearm restriction laws during the study period, 2 to 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). The results for total IPH and firearm IPH follow a similar pattern. Any state DVRO prohibition was associated with a reduction in both total IPH (incident rate ratio (IRR): 0.91, 95% confidence interval (CI): 0.83, 0.99) and firearm IPH (IRR: 0.87, 95% CI: 0.77, 0.97) (see Table 1). Violent misdemeanor prohibition laws were also associated with a reduction in total IPH (IRR: 0.77, 95% CI: 0.65, 0.92) and firearm IPH (IRR: 0.75, 95% CI: 0.60, 0.94); however, there was no statistically significant association found for firearm prohibitions exclusive to domestic violence misdemeanants. Reductions in total IPH (IRR: 0.89, 95% CI: 0.80, 0.99) were also associated

with permit-to-purchase laws. Finally, the federal MCDV firearm prohibition was associated with a decrease in firearm IPH (IRR=0.91, 95% CI: 0.84, 0.99).

Table 2 presents the results from the models that tested the associations of differing provisions of DVRO firearm restrictions with IPH. Compared to states with no DVRO firearm restrictions, states that included dating partners in their DVRO policy experienced an associated reduction in total IPH (IRR: 0.90, 95% CI: 0.82, 0.99) and firearm IPH (IRR: 0.86, 95% CI: 0.76, 0.98), 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 = 0.88, 95% CI: 0.79, 0.99) and firearm IPH (IRR: 0.84, 95% CI: 0.72, 0.98). Laws that did not cover ex parte orders experienced similar estimated decreases, but only the association with firearm IPH was statistically significant (IRR: 0.89, 95% CI: 0.79, 0.99). DVRO firearm relinquishment provisions were significantly associated with a decrease in firearm IPH rates (IRR = 0.88, 95% CI: 0.78, 0.99). Finally, we tested an additive interaction to determine the incidence rate ratio of having both a permit-to-purchase and DVRO firearm restriction law to having a DVRO firearm restriction law alone. Having both laws was associated with reduced IPH rates (IRR: 0.84, 95% CI: 0.73, 0.95) and reduced firearm IPH rates (IRR: 0.84, 95% CI: 0.76, 0.92) when contrasted with having a DVRO firearm restriction without permit-to-purchase requirements.

DISCUSSION

This research is a comprehensive examination of the associations between laws designed to prevent domestic violence offenders from accessing firearms and IPH rates at the state level over a 34-year study period. Our findings are consistent with 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 are remarkably similar, estimating a 9% or 8% reduction in IPH at the state level in association with DVRO gun restriction laws, respectively.⁶

This goes 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). The findings generally support our hypothesis that laws that restrict firearms from a broader population of individuals who commit domestic violence are more effective than more narrow laws at reducing IPHs. Specifically, DVRO firearm restrictions that cover dating partners – who comprised almost half of all IPH offenders in 2013²⁷ – were linked with a 10% reduction in IPH rates compared to an estimated 5% 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 12% reduction in IPHs and a 16% reduction in firearm IPHs. Firearm restrictions limited to final DVROs were linked to an 11% reduction in IPHs relative to no such laws. Considerable overlap in the confidence intervals of the IRRs for firearm IPHs for laws that included ex parte orders and those that excluded ex parte orders prevents us from inferring beneficial effects with broader restrictions. This may be due to difficulties with ex parte DVROs being served to respondents,²⁸ a necessary step for firearm relinquishment or recovery by law enforcement.

Consistent with prior research, the main models revealed no association of laws restricting access to firearms from those convicted of MCDV 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 25%. While previous research has not assessed domestic violence outcomes in association with this law, a study of violent misdemeanants in California who sought to purchase handguns just before and just after California passed this type of law found that denial of legal handgun purchase was associated with lower risk for subsequent offending involving violence and/or guns.²⁹

There are multiple reasons why the broader violent misdemeanor prohibition may convey more protection than prohibitions focused on MCDV. First, the law impacts those domestic violence offenders who were convicted of either domestic or non-domestic violent crimes and thereby disarming more violent offenders. Second, the purchase prohibition may be simpler to implement for violent misdemeanors generally than 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 purchase.

Purchase prohibitions for domestic violence offenders may be more effective in the presence of permit-to-purchase laws. Our results provide some support for our hypothesis that systems designed to prevent the transfer of guns to prohibited persons are associated with reductions in IPH. There is mounting evidence 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 due to DVROs are one way to promote dispossession. Some support was found for our hypothesis that laws that explicitly require surrender or grant law enforcement authority to remove firearms are associated with larger reductions in IPH than when enforcement is not addressed in the law. Compared to state-years without DVRO restrictions, presence of a DVRO firearm relinquishment law was associated with a 12% reduction in firearm IPH, while there was no clear effect of DVRO laws without relinquishment provisions. Both DVRO laws with and without relinquishment provisions neared significance in their estimated associations with IPH. These results, paired with the results of recent research that also found an associated reduction in IPH and firearm IPH in the presence of DVRO laws with relinquishment provisions,⁷ suggest that firearm relinquishment may be a critical part of firearm violence reduction strategies for domestic violence. However, prior literature has documented 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 it does 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, while other jurisdictions may make no such effort. Attempts were made to develop proxies for implementation and enforcement but proved unfruitful.

Another limitation of this research is that we may not have adequately controlled for confounding influences. While 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 non-firearm programs or policies that may have improved safety for victims of domestic violence. Additionally, while 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 such a large number of additional parameters to our models would overfit the data.

Closing

Data to inform and guide firearm policy discussions at the local, state, and national levels are needed to improve public safety. This research is consistent with previous findings that DVRO firearm restriction laws are associated with decreases in IPH, and adds new findings on the importance of specific DVRO provisions and on multiple additional firearm policies to the body of literature. Additionally, our research findings elicit questions for future research, including whether violent misdemeanor firearm restriction laws are associated with reductions in non-intimate partner homicides. Future research should also focus on implementation of the laws under study, particularly with a focus on providing roadmaps for greater implementation.

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Works Cited

1. Campbell JC, Webster DW, Koziol-McLain J, et al. Risk factors for femicide in abusive relationships: results from a multisite case control study. *Am J Public Health*. 2003;93(7):1069-1097.
2. Zeoli AM, Frattaroli S, Roskam K, et al. Removing firearms from those prohibited from possession by domestic violence restraining orders: A survey and analysis of state laws. *Trauma Violence Abus*. 2017; Online First.
3. Bouffard LA, Zedaker SB. Are Domestic Violence Offenders Specialists? Answers from Multiple Analytic Approaches. *Journal of Research in Crime and Delinquency*. 2016;53(6):788-813.
4. Frattaroli S, Vernick J. Separating batterers and guns: A review and analysis of gun removal laws in 50 states. *Eval Rev*. 2006;30(3):296-312.
5. Law Center to Prevent Gun Violence. Universal Background Checks. 2015. <http://smartgunlaws.org/gun-laws/policy-areas/background-checks/universal-background-checks/>. Accessed December 15, 2015.
6. Vigdor ER, Mercy JA. Do laws restricting access to firearms by domestic violence offenders prevent intimate partner homicide? *Eval Rev*. 2006;30(3):313-346.
7. Diez C, Kurland RP, Rothman EF, et al. State intimate partner violence-related firearm laws and intimate partner homicide rates in the United States, 1991 to 2015. *Ann Intern Med*. 2017;167(8):536-543.
8. Zeoli AM, Webster DW. Effects of domestic violence policies, alcohol taxes and police staffing levels on intimate partner homicide in large US cities. *Inj Prev*. 2010;16(2):90-95.
9. Vigdor ER, Mercy JA. Disarming batterers: the impact of domestic violence firearm laws. In: Ludwig J, Cook PJ, eds. *Evaluating Gun Policy*. Washington, DC: The Brookings Institution; 2003:157-214.
10. Fox JA, Swatt ML. Multiple imputation of the Supplementary Homicide Reports, 1976-2005. *J Quant Criminol*. 2009;25:51-77.
11. Fox JA. Uniform crime reports [United States]: Multiply-imputed Supplementary Homicide Reports Data File, 1976-2013. Northeastern University; 2015.
12. Azziz-Baumgartner E, McKeown L, Melvin P, et al. Rates of femicide in women of different races, ethnicities and places of birth: Massachusetts, 1993-2007. *Journal of Interpersonal Violence*. 2011;26(5):1077-1090.
13. Dugan L, Nagin DS, Rosenfeld R. Exposure reduction or retaliation? The effects of domestic violence resources on intimate-partner homicide. *Law Soc Rev*. 2003;37(1):169-198.
14. Dugan L. *The impact of policies, programs, and other exposure reducing factors on intimate partner homicide* [Dissertation]. Pittsburgh, PA: Public Policy and Management, Carnegie Mellon University; 1999.
15. Reckdenwald A, Parker KF. Understanding the change in male and female intimate partner homicide over time: A policy- and theory-relevant investigation. *Fem Criminol*. 2012;7(3):167-195.
16. Rosenfeld R. Changing relationships between men and women: A note on the decline in intimate partner homicide. *Homicide Studies*. 1997;1(1):72-83.

17. Vieraitis LM, Williams MR. Assessing the impact of gender inequality on female homicide victimization across U.S. cities. *Violence Against Women*. 2002;8(1):35-63.
18. Bureau of the Census, US Department of Commerce. Marriage and Divorce. Washington, DC: Bureau of the Census; 2015.
<https://www.census.gov/topics/families/marriage-and-divorce/data.html>. Accessed December 15, 2015.
19. Bureau of the Census, US Department of Commerce. Population and Housing Unit Estimates Datasets. Washington, DC: Bureau of the Census; 2015.
<https://www.census.gov/programs-surveys/popest/data/data-sets.html>. Accessed December 15, 2015.
20. Bureau of the Census, US Department of Commerce. Education. Washington, DC: Bureau of the Census; 2015.
<https://www.census.gov/topics/education/data.html>. Accessed December 15, 2015.
21. Bureau of the Census, US Department of Commerce. Poverty. Washington, DC: Bureau of the Census; 2015.
<https://www.census.gov/topics/income-poverty/poverty/data.html>. Accessed December 15, 2015.
22. Committee on Ways and Means, US House of Representatives. Green Book. 1981-2012. <http://greenbook.waysandmeans.house.gov/>. Accessed December 15, 2015.
23. Bureau of Labor Statistics, US Department of Labor. Local Area Unemployment Statistics. Washington, DC: Bureau of Labor Statistics; 2015.
<https://www.bls.gov/lau/data.htm>. Accessed December 15, 2015.
24. National Center for Health Statistics, Centers for Disease Control and Prevention. Underlying cause of Death 1999-2015. *CDC WONDER on-line database*. Atlanta, GA: National Center for Health Statistics; 2015.
<https://wonder.cdc.gov/ucd-icd10.html>. Accessed December 15, 2015.
25. National Center for Health Statistics, Centers for Disease Control and Prevention. Compressed Mortality File 1979-1998. *CDC WONDER on-line database*. Atlanta, GA: National Center for Health Statistics; 2015.
<https://wonder.cdc.gov/cmfi-icd9.html>. Accessed December 15, 2015.
26. *Stata* [computer program]. Version 14.2. College Station, TX: StataCorp LLC; 2015.
27. Federal Bureau of Investigation, US Department of Justice. Uniform Crime Reporting Program Data: Supplementary Homicide Reports, 2013. ICPSR36124-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research; 2015.
<http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/36124?q=Supplementary+Homicide+Reports+2013>; Accessed December 15, 2015.
28. Logan TK, Stevenson E, Evans L, et al. Rural and urban women's perceptions of barriers to health, mental health, and criminal justice services: Implications for victim services. *Violence and Victims*. 2004;19(1):37-62.
29. Wintemute GJ, Wright MA, Drake CM, et al. Subsequent criminal activity among violent misdemeanants who seek to purchase handguns: Risk factors and effectiveness of denying handgun purchase. *JAMA*. 2001;285(8):1019-1026.
30. Webster DW, Vernick JS, Bulzacchelli MT. Effects of state-level firearm seller accountability policies on firearms trafficking. *Journal of Urban Health*. 2009;86:525-537.

31. Webster DW, Vernick JS, McGinty EE, et al. Preventing the diversion of guns to criminals through effective firearm sales laws. In: Webster DW, Vernick JS, eds. *Reducing Gun Violence in America: Informing Policy with Evidence and Analysis*. Baltimore, MD: The Johns Hopkins University Press; 2013:109-121.
32. Rudolph KE, Stuart EA, Vernick JS, et al. Association between Connecticut's permit-to-purchase handgun law and homicides. *Am J Public Health*. 2015;105(8):e49-54.
33. Webster DW, Crifasi CK, Vernick JS. Effects of Missouri's repeal of its handgun purchaser licensing law on homicides. *Journal of Urban Health*. 2014;91(2):293-302.
34. Webster DW, Frattaroli S, Vernick JS, et al. Women with Protective Orders Report Failure to Remove Firearms from Their Abusive Partners: Results from an Exploratory Study. *J Womens Health*. 2010;19(1):93-98.
35. Wintemute GJ, Frattaroli S, Claire BE, et al. Identifying Armed Respondents to Domestic Violence Restraining Orders and Recovering Their Firearms: Process Evaluation of an Initiative in California. *Am J Public Health*. 2014;104(2):E113-E118.

Table 1. Associations Between Selected Firearm Laws and Intimate Partner Homicide in 45 States From 1980 Through 2013.^a

Law	Intimate Partner Homicides			Firearm Intimate Partner Homicides		
	IRR	95% CI	<i>P</i> value	IRR	95% CI	<i>P</i> value
Firearm restriction laws						
State DVRO	0.91	0.83, 0.99	0.036	0.87	0.77, 0.97	0.016
State MCDV	1.10	0.93, 1.30	0.252	1.17	0.99, 1.37	0.063
Violent misdemeanor	0.77	0.65, 0.92	0.003	0.75	0.60, 0.94	0.012
Stalking misdemeanor	1.09	0.97, 1.21	0.140	1.05	0.92, 1.21	0.467
Stalking felony	0.97	0.88, 1.08	0.634	0.93	0.80, 1.08	0.315
Federal DVRO	0.95	0.88, 1.03	0.242	1.00	0.91, 1.09	0.921
Federal MCDV	0.95	0.88, 1.01	0.099	0.91	0.84, 0.99	0.031
Purchase restriction implementation laws						
Permit to purchase	0.89	0.80, 0.99	0.040	0.90	0.81, 1.00	0.050
Background check	1.02	0.84, 1.23	0.851	1.04	0.82, 1.32	0.724
Point of contact state	0.99	0.91, 1.07	0.741	1.01	0.91, 1.12	0.893
Firearm confiscation from scene	0.95	0.85, 1.05	0.314	0.94	0.81, 1.08	0.371

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

^a Other factors controlled for are 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 four; educational ratio of women to men; a five-year rolling average of the percentage of suicides committed with firearms; the non-domestic 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.

Table 2. Associations Between Provisions of State Domestic Violence Restraining Order Firearm Restrictions and Intimate Partner Homicide in 45 States From 1980 Through 2013.^a

Law	Intimate Partner Homicides			Firearm Intimate Partner Homicides		
	IRR	95% CI	<i>P</i> value	IRR	95% CI	<i>P</i> value
Inclusion of dating partners						
No DVRO restriction	1	Referent		1	Referent	
DVRO restriction does not include dating partners	0.95	0.87, 1.05	0.309	0.92	0.82, 1.04	0.177
Dating partners included	0.90	0.82, 0.99	0.026	0.86	0.76, 0.98	0.026
Inclusion of ex parte DVROs						
No DVRO restriction	1	Referent		1	Referent	
DVRO restrictions does not cover ex parte orders	0.92	0.84, 1.02	0.102	0.89	0.79, 0.99	0.034
Ex parte orders covered	0.88	0.79, 0.99	0.028	0.84	0.72, 0.98	0.027
Inclusion of relinquishment law						
No DVRO restriction	1	Referent		1	Referent	
DVRO restriction without relinquishment law	0.93	0.85, 1.01	0.086	0.93	0.83, 1.04	0.226
Relinquishment law included	0.92	0.85, 1.01	0.077	0.88	0.78, 0.99	0.037

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

^a Each of the six 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 four; educational ratio of

women to men; a five-year rolling average of the percentage of suicides committed with firearms; the non-domestic 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.

**Analysis of the Strength of Legal Firearms Restrictions for Perpetrators of
Domestic Violence and their Impact on Intimate Partner Homicide**

Web Table 1. Associations Between Selected Firearm Laws and the Raw Counts of Intimate Partner Homicide in 45 States From 1980 Through 2013.^a

Law	Intimate Partner Homicides			Firearm Intimate Partner Homicides		
	IRR	95% CI	<i>P</i> value	IRR	95% CI	<i>P</i> value
Firearm restriction laws						
State DVRO	0.95	0.85, 1.06	0.355	0.92	0.81, 1.05	0.224
State MCDV	1.07	0.92, 1.24	0.393	1.10	0.96, 1.25	0.176
Violent misdemeanor	0.71	0.52, 0.97	0.033	0.70	0.47, 1.04	0.077
Stalking misdemeanor	1.12	0.98, 1.27	0.086	1.06	0.91, 1.23	0.474
Stalking felony	0.87	0.75, 1.01	0.077	0.92	0.66, 0.97	0.026
Federal DVRO	0.93	0.85, 1.03	0.164	1.00	0.91, 1.10	0.990
Federal MCDV	0.94	0.88, 1.03	0.113	0.91	0.82, 1.02	0.059
Purchase restriction implementation laws						
Permit to purchase	0.86	0.77, 0.96	0.009	0.85	0.76, 0.94	0.003
Background check	0.91	0.71, 1.16	0.442	0.91	0.66, 1.26	0.583
Point of contact state	0.94	0.85, 1.04	0.174	0.93	0.82, 1.06	0.293
Firearm confiscation from scene	0.91	0.79, 1.05	0.314	0.86	0.72, 1.03	0.101

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

^a Other factors controlled for are 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 four; educational ratio of women to men; a five-year rolling average of the percentage of suicides committed with firearms; the non-domestic 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.

Web Table 2. Effective dates for domestic violence-related firearm restrictions in effect by 2013

State	Domestic Violence Restraining Order Firearm Restriction ^a	Restraining Order Restriction Applies to Dating Partners ^b	Surrender Provision for Final Restraining Orders ^c	Restriction for ex parte Restraining Orders ^d	Violent Misdemeanor Restriction ^e	Stalking restriction ^f
Total states with change in law during study period (total changes)	29 (29)	22 (22)	21 (21)	16 (16)	18 (21)	21 (23)
Federal Law	9/13/94				9/30/96 (DV Only)	
Alabama						
Alaska	7/1/96	7/1/96	7/1/96			
Arizona	7/21/97	9/1/09	7/21/97	8/21/98	7/18/00 (DV Only)	7/13/1995 (Felony) 3/8/1993 (Felony) 1/1/2012 (Misdemeanor)
Arkansas						
California	1/1/91	1/1/91	1/1/95	1/1/95	1/1/91	
Colorado	2/26/94	2/26/94	7/1/13		02/28/1994–02/28/1999, 7/1/2000 (DV Only)	8/11/2010 (Felony)
Connecticut	10/1/94	6/23/99	10/1/94		10/1/94 (DV Only)	10/1/1994 (Misdemeanor) 7/21/1992–7/6/2003; 10/14/2008 (Felony)
Delaware	1/16/94	3/20/08	1/16/94	1/16/94	7/24/99 (DV Only)	
Georgia						
Hawaii	6/10/93	6/7/00	6/10/93	7/1/94	6/13/88	
Idaho						
Illinois	1/1/96	1/1/96	1/1/96	1/1/96	1/1/95	7/12/1992 (Felony)
Indiana	7/1/02	7/1/02	7/1/02		7/1/03 (DV Only)	7/1/1996 (Felony)
Iowa	7/1/10		7/1/10		1/1/2011(DV Only)	
Louisiana						
Maine	5/30/97		9/13/03			
Maryland	10/1/96		10/1/96		10/1/1996 (DV Only); 10/1/2003	10/1/1996 (Misdemeanor)
Massachusetts	6/7/94	6/7/94	6/7/94	6/7/94		10/21/1998 (Misdemeanor)
Michigan	4/1/96	4/1/96				
Minnesota					8/1/1993 (DV Only); 10/1/2003	8/1/1996 (Misdemeanor)
Mississippi						

Missouri						
Nevada	10/1/07	10/1/07	10/1/07			
New Hampshire	1/1/00	1/1/00	1/1/00	1/1/00		
New Jersey	11/11/91	8/11/94		11/11/91	1/14/04 (DV Only)	8/2/1993 (Felony)
New Mexico						
New York	11/1/96	7/21/08	11/1/96	11/1/96	Pre-1980	8/8/2000 (Misdemeanor)
North Carolina	11/1/95	12/1/97	12/1/03	12/1/03		
North Dakota					4/15/85	4/2/1993 (Misdemeanor)
Ohio						
Oklahoma						
Oregon						
Pennsylvania	12/5/94	8/12/95	12/5/94	5/9/06	pre-1980 (DV Only)	2/7/2003 (Misdemeanor)
Rhode Island	7/1/05	7/1/05	7/1/05			6/25/2002 (Felony)
South Carolina						1/1/2006 (Felony)
South Dakota					3/15/05 (DV Only)	
Tennessee	7/1/09		7/1/09		7/1/09 (DV Only)	
Texas	9/1/01	9/1/01		1/1/08	9/1/01 (DV Only)	9/1/2001 (Felony)
Utah	7/1/95			7/1/95		
Vermont	2/2/01	2/2/01				
Virginia	7/1/94			7/1/94		7/1/1994 (Misdemeanor)
Washington	7/1/94			7/1/94	7/1/94 (DV Only)	7/1/1994 (Misdemeanor)
West Virginia	6/2/98	6/2/98		4/14/01	6/7/00 (DV Only)	
Wisconsin	4/1/96	2/1/03	4/1/96			7/30/2002 (Felony)
Wyoming						

^a Presence of a state law that either automatically applies a firearm restriction to those under final domestic violence restraining orders who are current or former spouses, cohabitants, or share a child with the petitioner, or allows judges to do so at their discretion.

^b Presence of a state domestic violence restraining order firearm restriction, as defined in footnote a, that includes dating partners under relationships to which the firearm restriction can apply.

^c Presence of a state law that specifies that those prohibited from firearm possession under domestic violence restraining orders must surrender or relinquish their firearms or have them removed by law enforcement in some way. Specific instructions on how dispossession of firearms is to occur need not be present in the law to qualify as having a surrender provision.

^d Presence of a state law that mandates or authorizes that domestic violence restraining order firearm restrictions apply to orders given outside of (and generally before) a full hearing at which the respondent had notice and opportunity to take part in. These are also commonly referred to as ex parte, emergency, or temporary orders.

^e Presence of a state law that restricts those convicted of misdemeanor crimes of domestic violence (DV only) or those convicted of most violent misdemeanor crimes more generally from purchase and possession of firearms.

^f Presence of state law that extends firearm restrictions to all or the majority of stalking convictions. States that have restrictions for only some stalkers are not represented as having a law in this table. For example, states in which stalking misdemeanors may be upgraded to disqualifying felonies if the offense involved certain aggravating factors,

such as a minor victim, a previous conviction for stalking, or the violation of a protective order, are not considered here to have firearm restrictions for stalking convictions.

Web Table 3. Effective dates for laws related to implementation of purchase restrictions and removal of guns from the scene of domestic violence in effect by 2013.

State	Permit to Purchase ^a	Background Check by FFLs for private sales ^b	Point of Contact ^c	Mandated Removal of Firearms from scene of Domestic Violence ^d
Total states with change in law during study period	2 (3)	5 (6)	24 (31)	11 (11)
Federal Law				
Alabama				
Alaska				
Arizona			Full (1999–2002)	
Arkansas				
California		1/1/91	Full (1999)	1/1/00
Colorado			Full (1999)	
Connecticut	10/1/95		Full (1999)	
Delaware				
Georgia			Full (1999–2005)	
Hawaii	pre-1980		Full (1999)	7/3/12
Idaho				
Illinois	pre-1980		Full (1999)	7/1/94
Indiana		9/1/1983–11/30/1998	Partial (1999–2003)	
Iowa	pre-1980		Partial (1999)	
Louisiana				
Maine				
Maryland		10/1/96	Partial (1999)	
Massachusetts	pre-1980			
Michigan	pre-1980		Partial (1999–2012); No (2013)	
Minnesota				
Mississippi				
Missouri	1982–8/28/2007			
Nevada			Full (1999)	
New Hampshire			Partial (1999)	1/1/00
New Jersey	pre-1980		Full (1999)	1/14/04
New Mexico				
New York	pre-1980		Partial (1999–2004)	
North Carolina	pre-1980		Partial (1999)	
North Dakota				
Ohio				6/30/95
Oklahoma				9/1/93
Oregon			Partial (1999–2000); Full (2001)	
Pennsylvania		10/11/95	Full (1999)	4/16/86
Rhode Island		pre-1980		
South Carolina				
South Dakota				
Tennessee		pre-1980–11/1/998	Full (1999)	7/1/95

Texas		
Utah	Full (1999)	7/1/95
Vermont	Full (1999– 2001)	
Virginia	Full (1999)	
Washington	Partial (1999)	
West Virginia		9/1/01
Wisconsin	Partial (1999)	
Wyoming		

^a The presence of a state law that requires one to obtain a permit or license to purchase a firearm regardless of whether the seller is a federally licensed firearms dealer or private seller.

^b The presence of a state law that requires those who wish to purchase a firearm from a private seller to undergo a background check, conducted by a licensed firearms dealer, at the point of sale.

^c Whether a state requires the use of their own state-level databases in addition to federal databases to identify those prohibited from purchase at the point of sale.

^d The presence of a state law that mandates or provides law enforcement officers with the discretion to remove any or all firearms from the scene of domestic violence.