

Abortion Restrictions and Violence Against Women and Girls 15-44 in Missouri, 2012-2023

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Abstract

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Abortion restrictions in the United States continue to threaten the health equity and bodily autonomy of those who can become pregnant, increasing risk for violent victimization. Research is needed to understand how abortion restrictions contribute to the normalization of violence against women and girls.

This study used multiple interrupted time series analyses to examine the immediate and sustained effects of abortion restrictions on violence against women and girls aged 15-44 within Missouri from 2012 through 2023. Missouri passed and enforced three abortion restrictions between 2014 and 2019, and in 2022, enforced a trigger law following the Dobbs decision that banned access to abortion in the state.

We used homicide data from the Supplementary Homicide Reports Multiply-Imputed Database and calculated bimonthly homicide rates for the target population. Interruptions were based on the bimonthly period within which Missouri began enforcement of each abortion restriction. We assessed effect modification by race of the victim, weapon used, victim-offender relationship, and gender of offender.

Three out of the four abortion restrictions enforced in Missouri between 2012 through 2023 are associated with immediate increases to the homicide rate among women and girls, with minimal sustained trend changes in the months following. Homicides by male offenders and firearms were also observed to immediately increase following abortion restriction enforcement. Immediate increases in homicide rates were highest among Black women and girls, relative to White women and girls.

These findings highlight how abortion restrictions undermine gender health equity and contribute to violence against women and girls.

Introduction

Access to legal abortion has been consistently unstable and contested throughout the history of the United States.¹ In the period leading up to 1973, legal access to abortion was very limited, and a movement to increase legal access to abortion was growing. The landmark 1973 *Roe vs. Wade* Supreme Court decision was a significant advancement in guaranteeing access to legal abortion in the United States. This decision guaranteed abortion access to those who can become pregnant, predominantly women, as a federally protected, constitutional right.² This Supreme Court decision detailed that states had the authority to regulate abortion access but not completely ban it. Abortion restrictions laws could include targeted regulation of abortion providers (i.e., TRAP laws) such as burdensome facility requirements, unnecessary waiting periods after an abortion appointment consultation, or arbitrary gestational limits. Differences in the regulation and protection of legal abortion access between states and over time arise from the politicization of abortion.³ Political ideologies drive some states to push for stricter restrictions, while others advocate for broader protections. Following the 2022 *Dobbs* decision, which overturned the federal constitutional right to abortion established by *Roe v. Wade*, states can completely ban access to abortion in addition to enforcing restrictive abortion policies.²

A limited body of research has established the relationship between abortion restriction policies and violence against women. Most studies focus on intimate partner violence (IPV), specifically physical assault, sexual assault, or homicide caused by an intimate partner. One national study found that each additional TRAP law in a state was associated with a 3.4% increase in IPV-related homicides.⁴ Another study found that mandatory waiting periods were linked to increased IPV nationally, with some evidence suggesting a greater effect on Black and Hispanic populations.⁵ A different study found that homicide rates among those who are pregnant or within one year postpartum were significantly higher in states with more abortion restrictions and that Black individuals were more likely to be affected.⁶ The Turnaway Study found that pregnant women denied an abortion and who gave birth did not experience a reduction in physical IPV, while those who received abortions saw a decrease.⁷ These dynamics are reinforced by a meta-analysis of studies on IPV which identified unplanned pregnancy as one of the strongest modifiable risk factors to prevent exposure to IPV, indicating that restricting abortion access may have an impact on risk of violence.⁸

Abortion restrictions may increase women and girls' risk of violent victimization because they deprive those who can become pregnant, predominantly women, of their right to health equity and bodily self-determination. Nearly 40% of women and girls experience IPV in their lifetime with heightened risk during and a year after pregnancy.^{9,10} There are three key mechanisms of interest by which abortion restrictions increase risk for IPV. First, abortion restrictions lead to an increase in forced pregnancy and birth, as well as delays and denials of lifesaving care during pregnancy.^{11,12} This dynamic can force women in abusive relationships to maintain prolonged contact with violent partners, as having a child often deepens economic dependence on a partner and complicates opportunities to leave.^{7,13} Second, abortion restrictions can facilitate reproductive coercion, a type of IPV where one exerts control over another's reproductive choices.¹⁴ Through such means, abortion restrictions may increase offenders' power and control over partners who can become pregnant. Thus, abortion restrictions can increase the risk of violence for individuals who cannot safely disclose a pregnancy, are experiencing sexual violence, or have been threatened with harm for seeking an abortion. Finally, abortion restrictions may contribute to IPV by perpetuating structural sexism, the unfair treatment of

women through institutional policies or practices.^{15,16} As a form of structural sexism, abortion restrictions may contribute to the acceptance of patriarchal attitudes by normalizing the erosion of women's rights and status as equal citizens at the state level. This normalization can influence relationship dynamics and ultimately serve as a key driver of male-perpetrated IPV.^{4,14,17}

While previous research demonstrates that abortion restrictions are associated with risk of violent victimization against women, gaps remain.^{4,5} Most studies only provide cross-sectional evidence of abortion restrictions being associated with increased rates of violence against women which leaves questions unanswered about the causal role of abortion restrictions on violence.^{4,5,7} Other research has demonstrated that abortion restrictions impacts trends in other health outcomes, such as infant death, gestational age of abortion, and suicide.¹⁸⁻²⁰ Thus, abortion restrictions may be associated not only with increased rates of violence but also shifts in trends in violence as abortion restrictions are enforced. Given that abortion restrictions can contribute to structural sexism¹⁵ and general acceptance of patriarchal attitudes,¹⁶ there are gaps in understanding how such policies may also contribute to cases of violence against women unrelated to pregnancy or intimate partners. Although abortion policy treatment cannot be randomized, quasi-experimental methods provide a way to estimate the causal impact of abortion restrictions and their impact on various forms violence against women by creating a natural experiment where we observe rates of violence before and after a policy is implemented.²¹

Our current study uses multiple interrupted time series analyses to contribute to the limited evidence on the effects of abortion restrictions on violence against women and girls by examining homicide trends in one state: Missouri. Compared to national estimates, Missouri consistently has higher rates of homicide against women and lower rates of abortion (Figure 1).²² Lower rates of abortion in Missouri can be attributed to the passage and enforcement of a series of abortion restrictions between 2012 and 2023 that significantly limited access to abortion in the state.²³ These restrictions resulted in declining rates of abortion and the closure of most abortion clinics in the state.^{22,23} Using publicly available FBI Supplementary Homicide Reports data, we assess the immediate and sustained impacts of three key abortion restrictions passed and enforced by the Missouri state legislature between 2014 and 2019, as well as the 2022 enforcement of a trigger law that completely banned abortion access in the state (Table 1). By identifying trends in homicide rates following the enforcement of abortion restrictions in Missouri, this study aims to inform violence prevention efforts and further understand how abortion restrictions undermine gender health equity.

Methods

Data

Data were collected through the Federal Bureau of Investigation (FBI) Uniform Crime Report (UCR) Supplementary Homicide Reports (SHR) program.²⁷ Through the UCR SHR program, police departments either directly report homicides to the FBI or to their state's UCR program. Missouri has had a mandatory UCR reporting program since 2001.²⁸ Every law enforcement agency in Missouri is required to report crime data, including the demographic factors of the victim and offender, to the Missouri State Highway Patrol. All data submitted are reviewed by the Missouri State Highway Patrol which then stores the approved data and reports crime data to the FBI and other local agencies and organizations.

This study used the Supplementary Homicide Reports Multiply-Imputed Database.²⁹ This database uses SHR from 1976 through 2023 and applies imputation methods to fill in missing data for the characteristics of the offender, victim, and offender-victim relationship.³⁰ The database also includes weighted victim counts to account for unit missingness, which occurs when agencies fail to report homicide incidents to the FBI.

Study population

The study population included women aged 15-44 living in Missouri between January 1, 2012, to December 31, 2021. Women aged 15-44 represent reproductive-age women who can be directly affected by abortion restrictions.³¹

Exposure

The exposure of interest consisted of four abortion restriction policies (Table 1) passed and enforced in Missouri. The first three were state-level legislation that were enforced within the passage year: House Bill 1307, a mandatory waiting period bill (effective October 2014); Senate Bill 5, a TRAP law bill (effective October 2017); and House Bill 126, the Missouri Stands for the Unborn Act (effective August 2019). The fourth abortion restriction of interest was the enforcement of the 2019 trigger law following the June 2022 Dobbs decision that banned abortion in Missouri (effective June 24, 2022).

Outcome

We calculated monthly female homicides using weighted victim counts from the multiply-imputed SHR data. We included murder and non-negligent manslaughter deaths that occurred in Missouri between January 1st, 2012 and December 31st, 2023, involved two or fewer victims, and included at least one female victim between the ages of 15 and 44. We excluded justifiable homicides and negligent manslaughter, focusing on intentional homicides which are more likely to be influenced by abortion restrictions.

A bimonthly time series between January 1, 2012 to December 31, 2023 (72 time points) of female homicide rate per 100,000 person-years was calculated by dividing total weighted victims that met inclusion requirements per bimonthly period by the total annual target population estimates from the American Community Survey.

Effect modifiers

Four effect modification sub-analyses were conducted using the following imputed variables from the Fox data: race of victim, weapon used, offender-victim relationship, and gender of the offender. These variables were chosen because prior literature indicates that female homicide rates disproportionately impact Black women, are largely committed by firearms, and are often perpetrated by men who are often an intimate partners.³²

Additionally, because adherence to patriarchal beliefs is associated with increased violence against women³³ and abortion restrictions reinforce such norms,¹⁶ we hypothesized that these policies may contribute to increased violence against women by male offenders, regardless of their relationship to the victim.

Analysis

This study employed a multiple interrupted time series analysis using calculated bimonthly mortality rate data from January 1, 2012, to December 31, 2023, to estimate immediate and sustained changes in female homicide trends in Missouri following the enforcement of each abortion restriction. Bimonthly homicide rates were calculated because homicide is a relatively rare event in this target population and some months had no homicides. Because homicide rates often exhibit seasonality, autoregressive integrated moving average regression was used to account for these patterns. Interruptions occurred in the bimonthly period when each bill began to be enforced: October 2014 (T=17), October 2017 (T=35), August 2019 (T=46), and June 2022 (T=63).

The model was written as:

$$\text{Outcome}_{\text{HB1307(p)} \times \text{SB5(q)} \times \text{HB126(r)} \times \text{time(t)}} = \beta_0 + \beta_1 * \text{time}_t + \beta_2 * \text{level}_p + \beta_3 * \text{time} * \text{level}_{p*t} + \beta_4 * \text{level}_q + \beta_5 * \text{time} * \text{level}_{q*t} + \beta_6 * \text{level}_r + \beta_7 * \text{time} * \text{level}_{r*t} + \beta_8 * \text{level}_t + \beta_9 * \text{time} * \text{level}_{r*t} + \beta_{10} * \text{Confounders} + e$$

β_0 is the monthly homicide rate in Missouri at time=1, and β_1 is the homicide rate trend before the four abortion restrictions were enforced. β_2 , β_4 , β_6 , and β_8 are the immediate absolute homicide rate trend changes following the enforcement of HB1307, SB5, HB126, and the trigger law following the Dobbs decision respectively. β_3 , β_5 , β_7 , and β_9 are the sustained absolute homicide rate trend changes following the enforcement of HB1307, SB5, HB126, and the Dobbs trigger law respectively. Results were interpreted in the absolute scale to understand the total number of additional homicide deaths per 100,000 person-years that occurred following each abortion restriction.

The first sub-analysis assessed Black vs. White female victimization. The next sub-analysis examined the weapon used in the homicide. Specifically, analysis was stratified by cases involving and not involving firearms. Another sub-analysis considered the victim-offender relationship, separated into intimate partner and non-intimate partner (i.e., family members, friends, other offenders known to the victim, and strangers) homicides. The final sub-analysis considered the gender of the offender as reported by law enforcement: male and female.

We conducted two sensitivity analyses to explore if anticipation of the abortion restrictions increase homicide rates against women and girls in Missouri. This includes capturing the period

of deliberation, activism, and media coverage that often occurs prior to the passage of abortion restriction legislation as well as the time between passage and enforcement.^{18,34}

The first sensitivity analysis changed the interruptions to be when each restriction was passed, with most restrictions being passed one bimonthly period before enforcement (HB1307: T=16, SB5: T=34, HB126: T=45, and the Dobbs trigger law: T=63). Note that the Dobbs decision and the Missouri trigger law went into effect on the same day. The second sensitivity analysis changed the interruptions to be two bimonthly periods or four months before the bill was enforced (HB1307: T=15, SB5: T=33, HB126: T=44, and the Dobbs trigger law: T=61).
Confounders

We included time-varying confounders that influence both abortion restriction policies and homicide rates. Higher levels of gender inequality have been associated with increased homicide rates and more restrictive abortion policies.^{35,36} The Gender Inequality Index, developed by the United Nations Development Programme, can capture the degree of gender inequality in a state over time.³⁷ The Gender Inequality Index ranges from 0 to 1, where 0 indicates complete gender equality and 1 represents maximum gender inequality.

Using data from multiple sources, we calculated the Gender Inequality Index for Missouri for each year of interest using the methodology outlined in the United Nations Development Programme report, based on five key indicators: (1) maternal mortality ratio,³⁸⁻⁴⁰ (2) teen birth rate,⁴¹⁻⁴³ (3) government representation,⁴⁴ (4) educational attainment,⁴⁵ and (5) labor force participation.⁴⁶ Results for the Gender Inequality Index and methodology for calculating each indicator are detailed in the supplementary materials.

Results

Main summary

Between January 1, 2012 and December 31st, 2023, there were 827 homicides against women and girls aged 15-44 in Missouri with an overall homicide mortality rate of 1.02 deaths per 100,000 person-years. The following describes the immediate and sustained changes in homicide rates among women and girls aged 15–44 in Missouri after the enforcement of each abortion restriction of interest, controlled for changes to Gender Inequality Index over time. Homicide rates are presented for the overall target population and then stratified by race of victim, weapon type, and victim-offender relationship.

House Bill 1307, Mandatory waiting period bill

The 2014 mandatory waiting period bill increased the waiting period to 72-hours for women seeking abortion and is associated with a decline in abortion rates in Missouri (Table 1). Its enforcement was associated with an immediate increase in the homicide rate of women and girls aged 15-44 in Missouri with an additional 0.25 homicide deaths per 100,000 person-years (95% CI: 0.11, 0.38) (Table 2; Figure 2). There was a slight sustained increase of an additional 0.05 homicide deaths per 100,000 person-years (95% CI: 0.04, 0.06) in the months following.

Race of victim. Both Black and White women and girls aged 15-44 experienced immediate and sustained increases in homicide rates following the enforcement of the mandatory waiting period bill. However, the immediate and sustained increase was greater among Black women and girls compared to White women and girls (Table 2; Figure 3). Immediately after the bill's enforcement, there were 0.93 additional homicide deaths per 100,000 person-years among Black women and girls (95% CI: 0.13, 1.73). A sustained increase in homicide deaths among Black women and girls was also observed, with 0.23 additional homicide deaths per 100,000 person-years (95% CI: 0.17, 0.30).

Weapon type. Firearm-related homicides increased more than non-firearm related homicides among women and girls in Missouri immediately after the enforcement of the mandatory waiting period bill (Table 2; Figure 4). There were an additional 0.19 firearm-related homicide deaths per 100,000 person-years (95% CI: 0.07, 0.32). There was a slight sustained increase of 0.03 additional firearm-related homicide deaths per 100,000 person-years (95% CI: 0.02, 0.04).

Victim-offender relationship. Homicides committed by an intimate partner increased more than those committed by a non-intimate partner following the enforcement of the mandatory waiting period bill (Table 2; Figure 5). Specifically, there was an immediate increase of 0.12 additional homicide deaths by intimate partners per 100,000 person-years (95% CI: -0.09, 0.33), along with a slight sustained upward trend of 0.02 additional homicide deaths by intimate partners per 100,000 person-years (95% CI: 0.00, 0.05).

Gender of offender. Homicides committed by a male offender immediately increased following the enforcement of the mandatory waiting period bill with an 0.25 additional homicide deaths by men per 100,000 person-years (95% CI: 0.12, 0.39). In contrast, the immediate and sustained homicide rates against women and girls by a female offender remained relatively constant.

Senate Bill 5, TRAP law

The enforcement of TRAP laws in 2017 resulted in only one abortion clinic remaining by 2018. This bill was associated with immediate decreasing homicide rates among all women and girls aged 15-44 in Missouri with stable sustained trends (Table 2; Figure 1). In the overall population, we observed an immediate decrease of 0.25 homicide deaths per 100,000 person-years (95% CI: -0.42, -0.07) with minimal sustained changes, 0.00 additional homicide deaths per 100,000 person-years (95% CI: -0.03, 0.02). Similar trends were observed in all sub-analyses, with the exception of the homicide rates against Black women and girls.

Race of victim. Black women and girls experienced an immediate decrease in homicide rates following the enforcement of TRAP laws, with 1.43 fewer homicide deaths per 100,000 person-years (95% CI: -2.48, -0.38) (Table 2; Figure 3). Additionally, they were the only population analyzed to experience a sustained increase in homicide rates after the TRAP laws were enforced with an additional 0.18 homicide deaths per 100,000 person-years (95% CI: 0.06, 0.30). This is in contrast to White women and girls who experienced minimal immediate or sustained trend changes following the TRAP law bill.

Weapon type. Both the firearm and non-firearm homicide rates decreased immediately following the enforcement of SB5, with little change to their sustained trends (Table 2; Figure 4). Firearm homicide rates decreased by 0.13 firearm-related homicide deaths per 100,000 person-years (95% CI: -0.29, 0.03). Non-firearm deaths decreased by a lower magnitude with 0.07 fewer non-firearm related homicide deaths per 100,000 person-years (95% CI: -0.29, 0.16).

Victim-offender relationship. Both homicides committed by an intimate and non-intimate-partner decreased immediately following the enforcement of SB5 to similar extents, with little sustained change (Table 2; Figure 5). There were -0.10 fewer homicide deaths by an intimate partner per 100,000 person-years (95% CI: -0.34, 0.14) immediately following the enforcement of SB5. Similarly, there were -0.09 fewer homicide deaths by a non-intimate partner per 100,000 person-years (95% CI: -0.29, 0.12) immediately following the enforcement of SB5.

Gender of offender. Homicides committed by an male and female offender decreased to the similar extents following the enforcement of the TRAP law bill with an 0.15 fewer homicide deaths by men per 100,000 person-years (95% CI: -0.32, 0.02) and 0.10 fewer homicide deaths by women per 100,000 person-years (95% CI: -0.14, -0.05).

House Bill 126, Missouri Stands for the Unborn Act

The Missouri Stands for the Unborn Act enforced even more restrictions and resulted in the abortion rate in Missouri decreasing from 4 per 1000 women aged 15-44 in Missouri to 0.1 by 2020 (Figure 1). The enforcement of the 2019 Missouri Stands for the Unborn Act was associated with immediate increases to homicide rates and slightly decreasing sustained trends among all women and girls aged 15-44 in Missouri (Table 2; Figure 2). There were an additional 0.20 homicide deaths per 100,000 person-years (95% CI: -0.07, 0.47) among women and girls aged 15-44 in Missouri after the act was enforced. Sustained trends indicate slightly decreasing homicide rates following enforcement with -0.05 fewer homicide deaths per 100,000 person-years (95% CI: -0.07, -0.02). There were heterogeneous immediate and sustained changes

in sub-analyses of homicide rate by the race of the victim, weapon used in homicide, and relationship to offender.

Race of victim. White women and girls in Missouri experienced their largest immediate increase to their homicide rates following the enforcement of the Missouri Stands for the Unborn Act (Table 2; Figure 3). White women and girls experienced an immediate increase of 0.51 additional homicide deaths per 100,000 person-years (95% CI: 0.19, 0.83) with minimal sustained changes, 0.01 additional homicide deaths per 100,000 person-years (95% CI: -0.03, 0.05). This is in contrast to Black women and girls, who experienced an immediate decrease to their homicide rates, 1.30 fewer homicide deaths per 100,000 person-years (95% CI: -2.89, 0.29), with a sustained decreasing trend, 0.34 fewer homicide deaths per 100,000 person-years (95% CI: -0.47, -0.21).

Weapon type. Firearm-related homicides immediately increased following the enforcement of the Missouri Stands for the Unborn Act while non-firearm-related homicides slightly decreased in comparison (Table 2; Figure 4). There were an additional 0.29 firearm-related homicide deaths per 100,000 person-years (95% CI: 0.04, 0.53) immediately after enforcement with a slight sustained decrease in homicide rate, 0.03 fewer homicide deaths per 100,000 person-years (95% CI: -0.05, -0.01).

Victim-offender relationship. Homicides committed by an intimate partner and non-intimate partner both increased immediately following the enforcement of the Missouri Stands for the Unborn Act (Table 2; Figure 5). There were an additional 0.15 homicide deaths per 100,000 person-years (95% CI: -0.12, 0.43) by an intimate partner and an additional 0.17 homicide deaths per 100,000 person-years (95% CI: -0.07, 0.40) by a non-intimate partner immediately after enforcement. Sustained trends following enforcement had a slight decrease (Table 2).

Gender of offender. Homicides committed by a male offender immediately increased following the enforcement of the Missouri Stands for the Unborn Act with an 0.36 additional homicide deaths by men per 100,000 person-years (95% CI: 0.10, 0.62). In contrast, the homicide rates against women and girls by a female offender immediately decreased, with 0.16 fewer homicide deaths per 100,000 person-years (95% CI: -0.23, -0.09).

Dobbs vs. Jackson Women's Health Organization, Trigger law

The 2022 Dobbs decision resulted in the enforcement of a trigger law passed in the Missouri Stands for the Unborn Act. This trigger law resulted in a complete ban on abortion in Missouri. This ban was associated with immediate increases to homicide rates among all women and girls aged 15-44 in Missouri with an additional 0.50 homicide deaths per 100,000 person-years (95% CI: 0.28, 0.72) (Table 2; Figure 2). Sustained homicide rate trends were slightly declining with 0.04 fewer homicide deaths per 100,000 person-years (95% CI: -0.07, 0.01). Sub-analyses by the race of the victim, weapon used in homicide, and relationship to offender generally indicated immediate increases to homicide rates with sustained declines with some exceptions (Table 2).

Race of victim. Black women and girls in Missouri experienced their greatest immediate increase to their homicide rate following the enforcement of the trigger law with an additional 3.77 homicide deaths per 100,000 person-years (95% CI: 2.44, 5.09) (Table 2; Figure 3). This is the

greatest immediate increase observed after the enforcement of an abortion restriction. The homicide rate against Black women and girls had a sustained declining trend following the enforcement of the trigger law with 0.64 fewer homicide deaths per 100,000 person-years (95% CI: -0.82, -0.46). White women and girls also experienced immediate increases to their homicide rate in the period following the trigger law being enforced, though to a smaller extent: 0.15 homicide deaths per 100,000 person-years (95% CI: -0.17, 0.46). They also had a slight sustained increasing trend with an additional 0.03 additional homicide deaths per 100,000 person-years (95% CI: -0.02, 0.07).

Weapon type. Firearm-related homicides immediately increased following trigger law enforcement while non-firearm related homicides slightly decreased (Table 2; Figure 4). Right after the trigger law went into effect, there was an additional 0.67 firearm-related homicide deaths per 100,000 person-years (95% CI: 0.47, 0.88). In contrast, there were 0.07 fewer non-firearm-related homicide deaths per 100,000 person-years (95% CI: -0.31, 0.16). In terms of sustained effects, firearm-related homicide deaths decreased by 0.08 per 100,000 person-years (95% CI: -0.11, -0.05), while non-firearm-related homicide deaths increased by 0.03 per 100,000 person-years (95% CI: -0.01, 0.06).

Victim-offender relationship. Homicides committed by non-intimate partners increased more than those committed by intimate partners following the enforcement of the trigger law, with an additional 0.40 non-intimate partner-related homicide deaths per 100,000 person-years (95% CI: 0.17, 0.62) with a sustained declining trend (Table 2; Figure 5).

Gender of offender. Homicides committed by a male offender immediately increased following the enforcement of the trigger law with an 0.48 additional homicide deaths by men per 100,000 person-years (95% CI: 0.27, 0.70). In contrast, the immediate and sustained homicide rates against women and girls by a female offender remained relatively constant.

Sensitivity Analyses

When the interruption for each restriction was moved to when each restriction was passed rather than when they were enforced (Table 3), the results largely remained the same with the exception of non-firearm-related homicide deaths, which changed direction from increasing immediately after the mandatory waiting period bill to decreasing.

When the interruption for each restriction was moved to two bimonthly periods (i.e., four months) before each bill was enforced (Table 4), the immediate changes to the homicide rate following the mandatory waiting period bill were much smaller than those observed in the original analysis, with many estimates approaching zero additional homicides; however, the sustained trends remained the same. For the TRAP law bill, Missouri Stands for the Unborn Act, and the Dobbs trigger law, no significant changes were observed from the original analysis besides the magnitude of additional homicide deaths decreasing slightly for most cases. Exceptions included an immediate decrease instead of an increase in homicides by an intimate partner after the Missouri Stands for the Unborn Act and the Dobbs trigger Law.

Discussion

This study found that the enforcement of three abortion restrictions in Missouri were associated with immediate increases to homicide rates among women and girls aged 15-44 years old: the 2014 mandatory waiting period bill, the 2019 Missouri Stands for the Unborn Act, and the 2022 enforcement of the trigger law following the Dobbs decision. The enforcement of one abortion restriction in Missouri was associated with immediate decreases to the homicide rate against women and girls: the 2017 TRAP law bill.

Our results suggest that restrictive policies that target abortion-seeking behavior are associated with increased homicide rates against women and girls. This relationship may stem from restrictions on individual abortion access directly burdening individuals seeking abortion. In our study period, these included an extended mandatory waiting period, heightened informed consent requirements, and the complete elimination of elective abortion services. By regulating individual decisions, such policies may increase women and girls' risk of exposure to violence by making it harder to obtain abortions and thus prolonging connection to abusive relationships, increasing economic dependence, or enabling reproductive coercion.^{7,13,14} Our results are consistent with most national studies linking abortion restrictions, such as mandatory waiting periods and the total burden of abortion restrictions, to increased rates violence against women, predominantly IPV against women and those who are pregnant or recently pregnant. Also consistent with previous research, our effect modification results demonstrated that Black women and girls experienced a greater increase in homicide victimization following abortion restrictions than their White counterparts.^{5,6}

In contrast, Missouri's 2017 TRAP law, which imposed additional regulations on abortion providers, did not include provisions that directly altered individual interactions with abortion providers or resulted in immediate clinic closures following its enforcement.²³ This may explain the observed decline in homicide rates after the TRAP law's enforcement, as access to abortion services was not immediate. These findings are in contrast to a national study that found that each additional TRAP law in a state was associated with a 3.4% increase in IPV-related female homicides.⁴ The difference in findings may stem from this study examining a wide range of abortion restrictions over time within a single state, while the Wallace et al. study focused on TRAP laws across multiple states while controlling for state and year fixed effects. Moreover, effects of abortion restrictions may vary across states, and further research is needed to understand the impacts of different types of abortion restrictions on violence.

The immediate surge in homicide rates following abortion restrictions was primarily driven by male offenders and the use of firearms, two factors strongly associated with violence against women.³² Men disproportionately use firearms to commit homicide against women, particularly in the context of intimate partner relationships.⁴⁷ Prior research has established a link between abortion restrictions and the reinforcement of these patriarchal gender norms.¹⁶ Additionally, research has found that acceptance of patriarchal gender ideologies strongly predicts both male-perpetrated intimate partner violence and firearm use.^{17,47,48} As a form of structural sexism, abortion restrictions normalize the erosion of women's rights, undermine their status as equal citizens, and reinforce patriarchal gender norms.^{4,14,15,17} These dynamics may contribute to the acceptance of such norms in Missouri and drive the observed immediate increases in homicide rates against women following the enforcement of abortion restrictions. In our analysis, we observed increases in homicides committed by both intimate and non-intimate partners following the enforcement of abortion restrictions, suggesting that the broader cultural

reinforcement of patriarchal norms may extend beyond the intimate sphere and influence violence perpetrated by men more broadly.

This study should be interpreted in light of several limitations. First, homicide rates against women and girls may have been impacted by co-occurring policies and events that were unrelated to abortion, such as permissive firearm policies, which are associated with increased homicide rates against women.⁴⁹ Missouri passed and enforced four permissive firearm policies between 2012 through 2022.⁵⁰ Without a counterfactual group, we could not control for co-occurring policies. However, we included multiple interruptions to observe how repeated exposure to abortion restrictions impacted homicide rates. The second limitation is that this study used a bimonthly time series. Some abortion restriction enforcements occurred in the latter half of a bimonthly period, leading to interruptions that included homicides occurring before the restriction was actually enforced. As a result, our estimates may lack precision in capturing the impact of abortion restrictions on homicide rates. Future research should use more granular approaches to better assess these effects. The third limitation pertains to the known national mismeasurement in Missouri UCR program.³⁰ This study attempted to alleviate the missingness of the data by using the SHR Multiply-Imputed Database, which estimated an additional 23 homicides not included in the non-imputed SHR.³⁰ Despite using the SHR Multiply-Imputed Database, further analysis by ethnicity or other racial groups was not possible because the dataset does not include ethnicity, and most victim race and ethnicity data are missing or unavailable. As a result, homicide rates by these groups would be small and unreliable. Finally, homicides represent a small percentage of total injuries and only the most severe cases of violence.⁵¹ Our results underestimate the total rates of violence against women, which include non-fatal violence.

To our knowledge, this study is the first to quantify the immediate and sustained changes of new abortion restriction laws on homicides of women and girls over time. Future research should continue to examine the role of different types of abortion restrictions— mandatory waiting periods, TRAP laws, and complete bans— to determine which are most likely to influence rates of violence and to further clarify the mechanisms through which these restrictions exert their effects. Additionally, future research is needed on violence against women and girls in Missouri since the people of this state voted to enshrine abortion rights in the state constitution in 2024, overturning the 2022 enforcement of the trigger law.⁵² This may provide an opportunity to observe whether abortion access can be protective for the safety of women and girls. Overall, our findings highlight the harmful consequence of abortion restrictions on the health and safety of women and girls, increasing their vulnerability to violence.

Tables

Table 1. Three Key Abortion Restrictions Passed in Missouri between 2014 to 2022

Bill	Date Passed	Date Effective	Key Policy Points
House Bill 1307 ²⁴ (HB1307, Mandatory waiting period bill)	September 2014	October 2014	Increased the mandatory waiting period for abortions from 24 to 72 hours, making it one of the longest waiting periods in the country
Senate Bill 5 ²⁵ (SB5, TRAP law bill)	July 2017	October 2017	Requires physician complication plans; regulates who can gather consent to abortion procedures; requires fetal tissue pathology reports; expands attorney general jurisdiction; prohibits local regulation of pregnancy resource centers; protects whistleblowers who report abortion law violations; requires annual, unannounced inspections of abortion facilities; establishes criminal penalties for abortion clinic employees that deviate from state standard of care
House Bill 126 ²⁶ (HB126, Missouri Stands for the Unborn Act)	May 2019	August 2019	Adds gestational limits, trigger law, and additional parental consent; adds additional mandatory informed consent procedures; adds additional insurance requirements for abortion providers
Dobbs vs. Jackson Women's Health Organization ² (Trigger law)	June 2022	June 2022	Trigger law banning abortion entirely in Missouri went into effect with minimal exceptions

Table 2. *The Absolute Immediate and Sustained Trend Changes to Homicide Death Rates Against Women and Girls Aged 15-44 per 100,000 person-years After the Enforcement of Four Abortion Restrictions*

	HB1307 Mandatory waiting period bill T=17		SB5 TRAP law bill T=35		HB126 Missouri Stands for the Unborn Act T=46		Dobbs vs. Jackson Women's Health Organization Trigger law T=63	
	Immediate Change	Sustained Change	Immediate Change	Sustained Change	Immediate Change	Sustained Change	Immediate Change	Sustained Change
Overall	0.25 [0.11, 0.38]	0.05 [0.04, 0.06]	-0.25 [-0.42, -0.07]	0.00 [-0.03, 0.02]	0.20 [-0.07, 0.47]	-0.05 [-0.07, -0.02]	0.50 [0.28, 0.72]	-0.04 [-0.07, -0.01]
Race								
White	0.17 [-0.08, 0.42]	0.02 [-0.01, 0.04]	0.01 [-0.28, 0.30]	-0.03 [-0.07, 0.00]	0.51 [0.19, 0.83]	0.01 [-0.03, 0.05]	0.15 [-0.17, 0.46]	0.03 [-0.02, 0.07]
Black	0.93 [0.13, 1.73]	0.23 [0.17, 0.30]	-1.43 [-2.48, -0.38]	0.18 [0.06, 0.30]	-1.30 [-2.89, 0.29]	-0.34 [-0.47, -0.21]	3.77 [2.44, 5.09]	-0.64 [-0.82, -0.46]
Weapon								
Firearm	0.19 [0.07, 0.32]	0.03 [0.02, 0.04]	-0.13 [-0.29, 0.03]	-0.01 [-0.03, 0.01]	0.29 [0.04, 0.53]	-0.03 [-0.05, -0.01]	0.67 [0.47, 0.88]	-0.08 [-0.11, -0.05]
Non-Firearm	0.03 [-0.17, 0.22]	0.02 [-0.00, 0.04]	-0.07 [-0.29, 0.16]	0.00 [-0.03, 0.03]	-0.05 [-0.29, 0.18]	-0.01 [-0.05, 0.02]	-0.07 [-0.31, 0.16]	0.03 [-0.01, 0.06]
Relationship								
Intimate	0.12 [-0.09, 0.33]	0.02 [0.00, 0.05]	-0.10 [-0.34, 0.14]	-0.00 [-0.03, 0.03]	0.15 [-0.12, 0.43]	-0.03 [-0.06, 0.00]	0.14 [-0.13, 0.40]	0.02 [-0.02, 0.06]
Non-Intimate	0.08 [-0.09, 0.25]	0.02 [0.00, 0.04]	-0.09 [-0.29, 0.12]	-0.01 [-0.03, 0.02]	0.17 [-0.07, 0.40]	-0.01 [-0.04, 0.02]	0.40 [0.17, 0.62]	-0.06 [-0.09, -0.03]
Gender of Offender								
Male	0.25 [0.12, 0.39]	0.05 [0.03, 0.06]	-0.15 [-0.32, 0.02]	-0.01 [-0.03, 0.01]	0.36 [0.10, 0.62]	-0.04 [-0.06, -0.02]	0.48 [0.27, 0.70]	-0.03 [-0.06, -0.00]
Female	-0.01 [-0.04, 0.03]	0.01 [0.01, 0.01]	-0.10 [-0.14, -0.05]	0.01 [0.00, 0.01]	-0.16 [-0.23, -0.09]	-0.01 [-0.01, -0.00]	0.02 [-0.04, 0.08]	-0.01 [-0.02, -0.01]

Table 3. *Sensitivity Analysis – Absolute Immediate and Sustained Trend Changes to Homicide Death Rates Against Women and Girls Aged 15-44 per 100,000 person-years After the Passage of Four Abortion Restrictions*

	HB1307 Mandatory waiting period bill T=16		SB5 TRAP law bill T=34		HB126 Missouri Stands for the Unborn Act T=45		Dobbs vs. Jackson Women's Health Organization Trigger law T=63	
	Immediate Change	Sustained Change	Immediate Change	Sustained Change	Immediate Change	Sustained Change	Immediate Change	Sustained Change
Overall	0.13 [-0.00, 0.27]	0.06 [0.05, 0.07]	-0.29 [-0.46, -0.11]	-0.01 [-0.03, 0.01]	0.18 [-0.05, 0.41]	-0.04 [-0.07, -0.02]	0.46 [0.25, 0.66]	-0.04 [-0.07, -0.01]
Race								
White	0.03 [-0.22, 0.28]	0.02 [-0.00, 0.05]	-0.06 [-0.34, 0.23]	-0.05 [-0.08, -0.01]	0.50 [0.21, 0.79]	0.01 [-0.02, 0.05]	0.12 [-0.18, 0.42]	0.03 [-0.02, 0.07]
Black	0.45 [-0.36, 1.27]	0.26 [0.19, 0.33]	-1.90 [-2.94, -0.87]	0.18 [0.06, 0.30]	-1.09 [-2.44, 0.26]	-0.37 [-0.50, -0.24]	3.85 [2.63, 5.06]	-0.64 [-0.81, -0.46]
Weapon								
Firearm	0.11 [-0.02, 0.24]	0.03 [0.02, 0.04]	-0.14 [-0.31, 0.02]	-0.01 [-0.03, 0.00]	0.24 [0.03, 0.46]	-0.03 [-0.05, -0.01]	0.62 [0.43, 0.82]	-0.08 [-0.11, -0.05]
Non-Firearm	-0.08 [-0.28, 0.11]	0.02 [-0.00, 0.04]	-0.12 [-0.34, 0.10]	-0.01 [-0.04, 0.02]	0.04 [-0.19, 0.26]	-0.01 [-0.04, 0.02]	-0.05 [-0.28, 0.18]	0.03 [-0.01, 0.06]
Relationship								
Intimate	0.04 [-0.16, 0.24]	0.03 [0.01, 0.05]	-0.17 [-0.40, 0.06]	-0.01 [-0.04, 0.02]	0.13 [-0.11, 0.38]	-0.03 [-0.06, 0.00]	0.11 [-0.14, 0.35]	0.02 [-0.01, 0.06]
Non-Intimate	0.00 [-0.17, 0.17]	0.02 [0.01, 0.04]	-0.10 [-0.30, 0.10]	-0.02 [-0.04, 0.01]	0.17 [-0.04, 0.38]	-0.01 [-0.03, 0.02]	0.39 [0.18, 0.60]	-0.06 [-0.09, -0.03]
Gender of Offender								
Male	0.14 [0.01, 0.28]	0.05 [0.04, 0.07]	-0.21 [-0.38, -0.04]	-0.02 [-0.04, 0.00]	0.26 [0.04, 0.49]	-0.04 [-0.06, -0.02]	0.40 [0.20, 0.61]	0.14 [0.01, 0.28]
Female	-0.01 [-0.05, 0.03]	0.01 [0.00, 0.01]	-0.08 [-0.13, -0.03]	0.01 [-0.00, 0.01]	-0.08 [-0.15, -0.02]	-0.00 [-0.01, 0.00]	0.05 [-0.01, 0.12]	-0.01 [-0.05, 0.03]

Table 4. Sensitivity Analysis – Absolute Immediate and Sustained Trend Changes to Homicide Death Rates Against Women and Girl Aged 15-44 per 100,000 person-years Two Bimonthly Periods Before the Enforcement of Abortion Restrictions

	HB1307 Mandatory waiting period bill T=15		SB5 TRAP law bill T=33		HB126 Missouri Stands for the Unborn Act T=44		Dobbs vs. Jackson Women's Health Organization Trigger law T=61	
	Immediate Change	Sustained Change	Immediate Change	Sustained Change	Immediate Change	Sustained Change	Immediate Change	Sustained Change
Overall	0.03 [-0.11, 0.18]	0.07 [0.06, 0.08]	-0.28 [-0.45, -0.10]	-0.02 [-0.04, 0.00]	0.17 [-0.04, 0.37]	-0.05 [-0.07, -0.02]	0.32 [0.15, 0.49]	-0.01 [-0.02, 0.01]
Race								
White	0.06 [-0.21, 0.33]	0.03 [-0.00, 0.06]	-0.07 [-0.37, 0.24]	-0.04 [-0.08, -0.00]	0.32 [0.01, 0.63]	0.01 [-0.03, 0.05]	-0.02 [-0.32, 0.28]	0.03 [-0.01, 0.07]
Black	0.01 [-0.78, 0.79]	0.29 [0.22, 0.36]	-1.90 [-2.85, -0.94]	0.14 [0.02, 0.25]	-0.36 [-1.47, 0.75]	-0.43 [-0.55, -0.30]	4.02 [3.08, 4.96]	-0.35 [-0.45, -0.25]
Weapon								
Firearm	0.02 [-0.12, 0.16]	0.04 [0.03, 0.05]	-0.13 [-0.30, 0.04]	-0.02 [-0.04, 0.00]	0.23 [0.03, 0.43]	-0.03 [-0.06, -0.01]	0.51 [0.35, 0.68]	-0.03 [-0.05, -0.01]
Non-Firearm	0.05 [-0.14, 0.24]	0.03 [0.00, 0.05]	-0.12 [-0.34, 0.09]	0.00 [-0.03, 0.03]	0.01 [-0.21, 0.22]	-0.02 [-0.05, 0.01]	-0.03 [-0.24, 0.18]	0.02 [-0.01, 0.05]
Relationship								
Intimate	0.05 [-0.05, 0.15]	0.04 [0.03, 0.05]	-0.18 [-0.30, -0.05]	0.00 [-0.01, 0.01]	-0.05 [-0.19, 0.09]	-0.03 [-0.05, -0.01]	-0.19 [-0.31, -0.07]	0.03 [0.02, 0.05]
Non-Intimate	-0.02 [-0.10, 0.07]	0.03 [0.02, 0.04]	-0.10 [-0.20, 0.00]	-0.02 [-0.03, -0.01]	0.22 [0.10, 0.34]	-0.02 [-0.03, -0.00]	0.51 [0.41, 0.61]	-0.04 [-0.05, -0.03]
Gender of Offender								
Male	0.05 [-0.10, 0.20]	0.06 [0.05, 0.08]	-0.23 [-0.41, -0.05]	-0.02 [-0.04, 0.00]	0.17 [-0.04, 0.39]	-0.04 [-0.07, -0.02]	0.18 [0.01, 0.36]	0.01 [-0.01, 0.03]
Female	-0.01 [-0.05, 0.02]	0.01 [0.00, 0.01]	-0.05 [-0.09, -0.00]	-0.00 [-0.01, 0.00]	-0.01 [-0.06, 0.05]	-0.00 [-0.01, 0.00]	0.14 [0.09, 0.18]	-0.01 [-0.02, -0.01]

Figures

Figure 1. Comparing national abortion rate changes to those in Missouri ²²

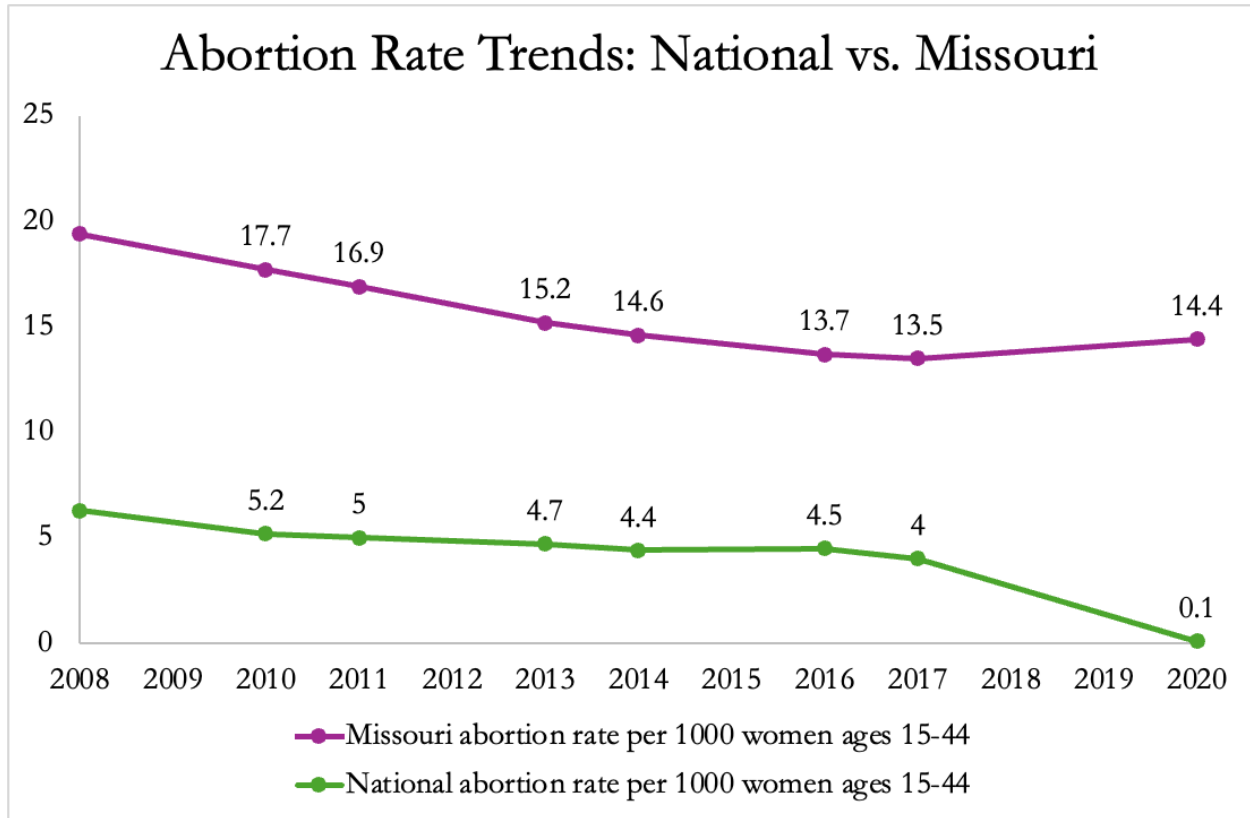


Figure 2. Overall

Homicide Mortality Rate Trends among Women and Girls Aged 14-55 in Missouri 2012-2023

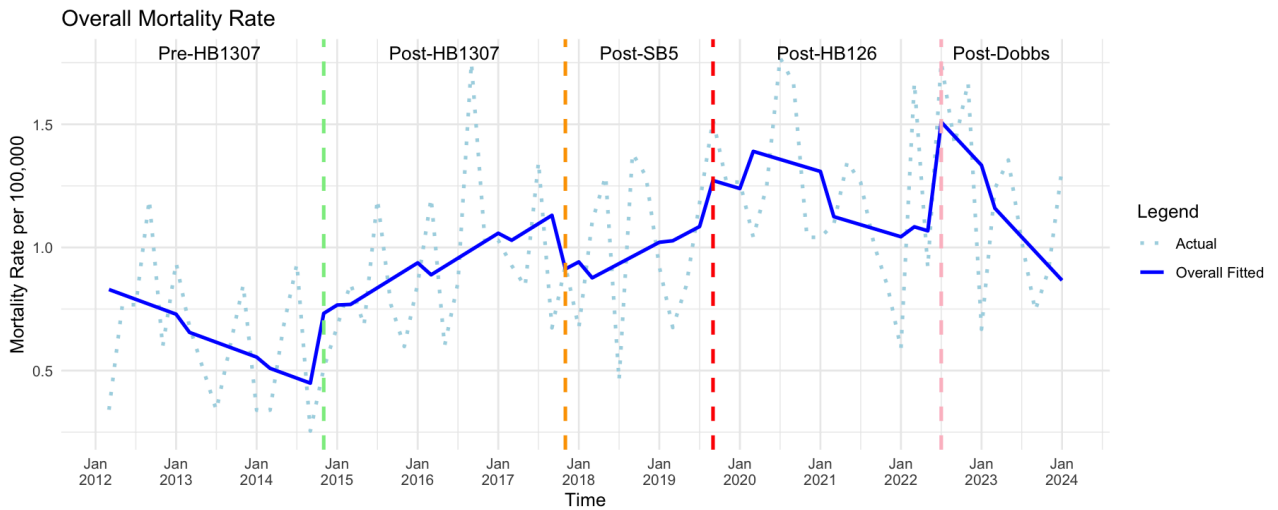


Figure 3. Race

Homicide Mortality Rate Trends among Women and Girls Aged 14-55 by Population in Missouri 2012-2023

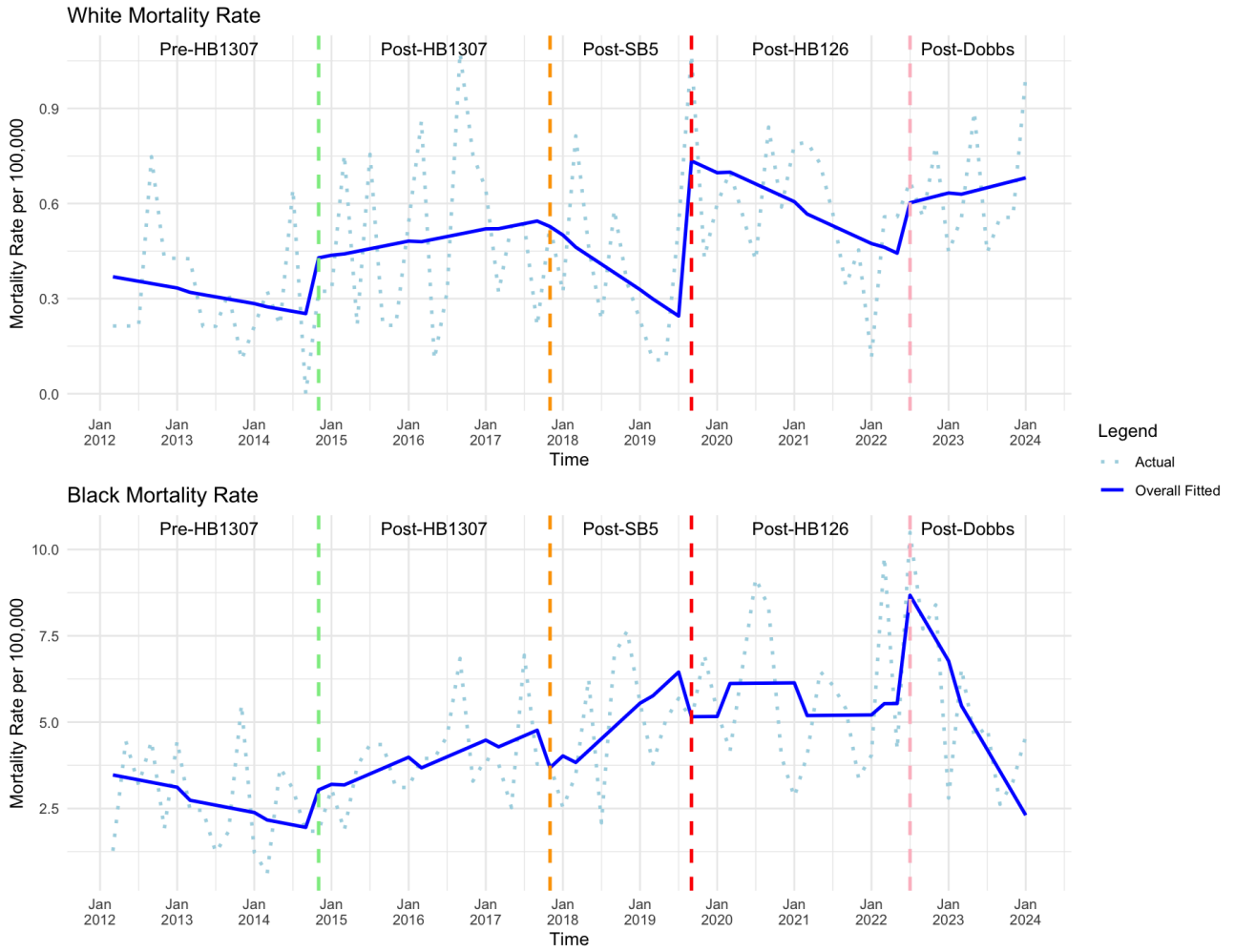


Figure 4. Weapon

Homicide Mortality Rate Trends among Women and Girls Aged 14-55 by Method in Missouri 2012-2023

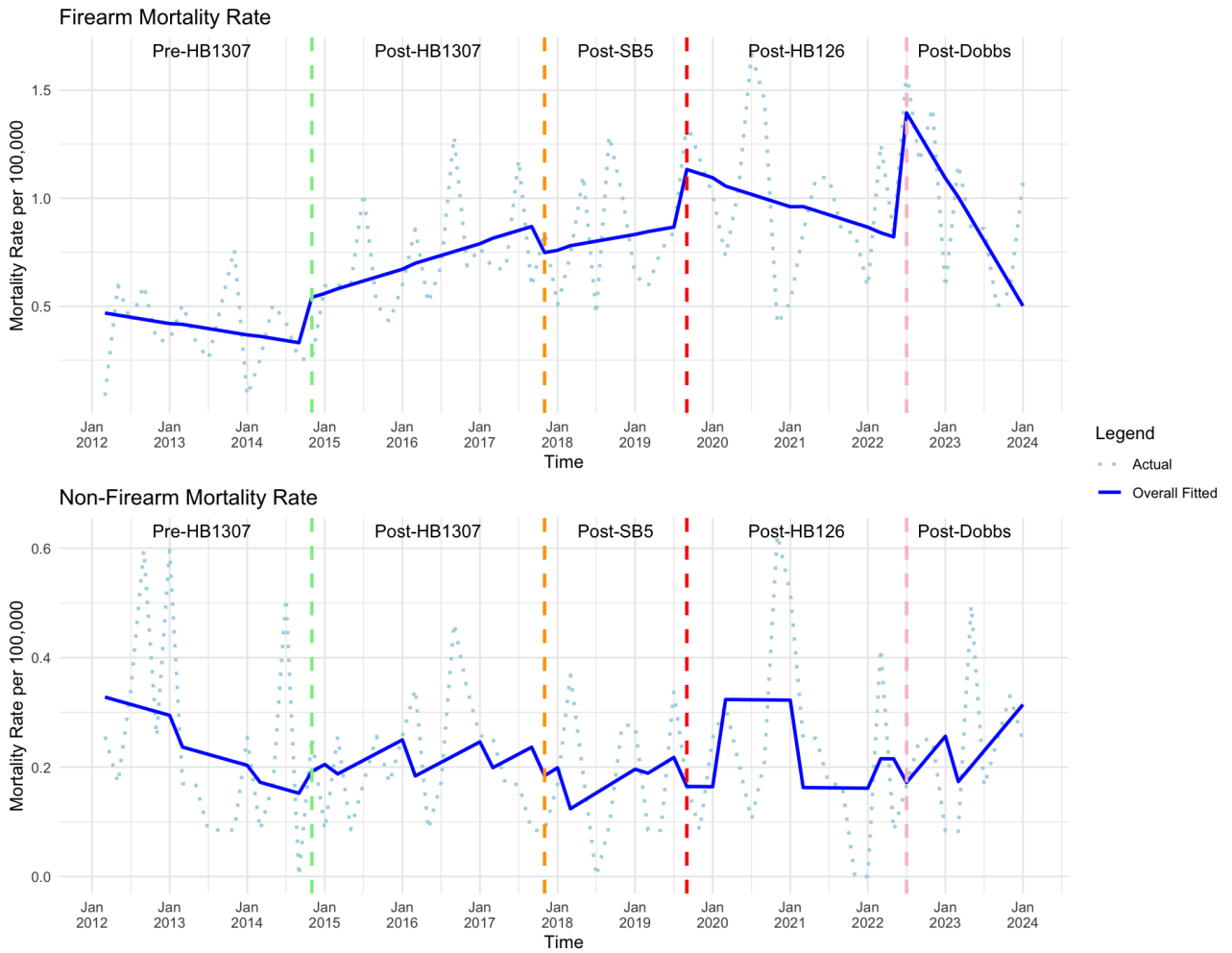


Figure 5. Relationship between offender and victim

Homicide Mortality Rate Trends among Women and Girls Aged 14-55 by Method in Missouri 2012-2023

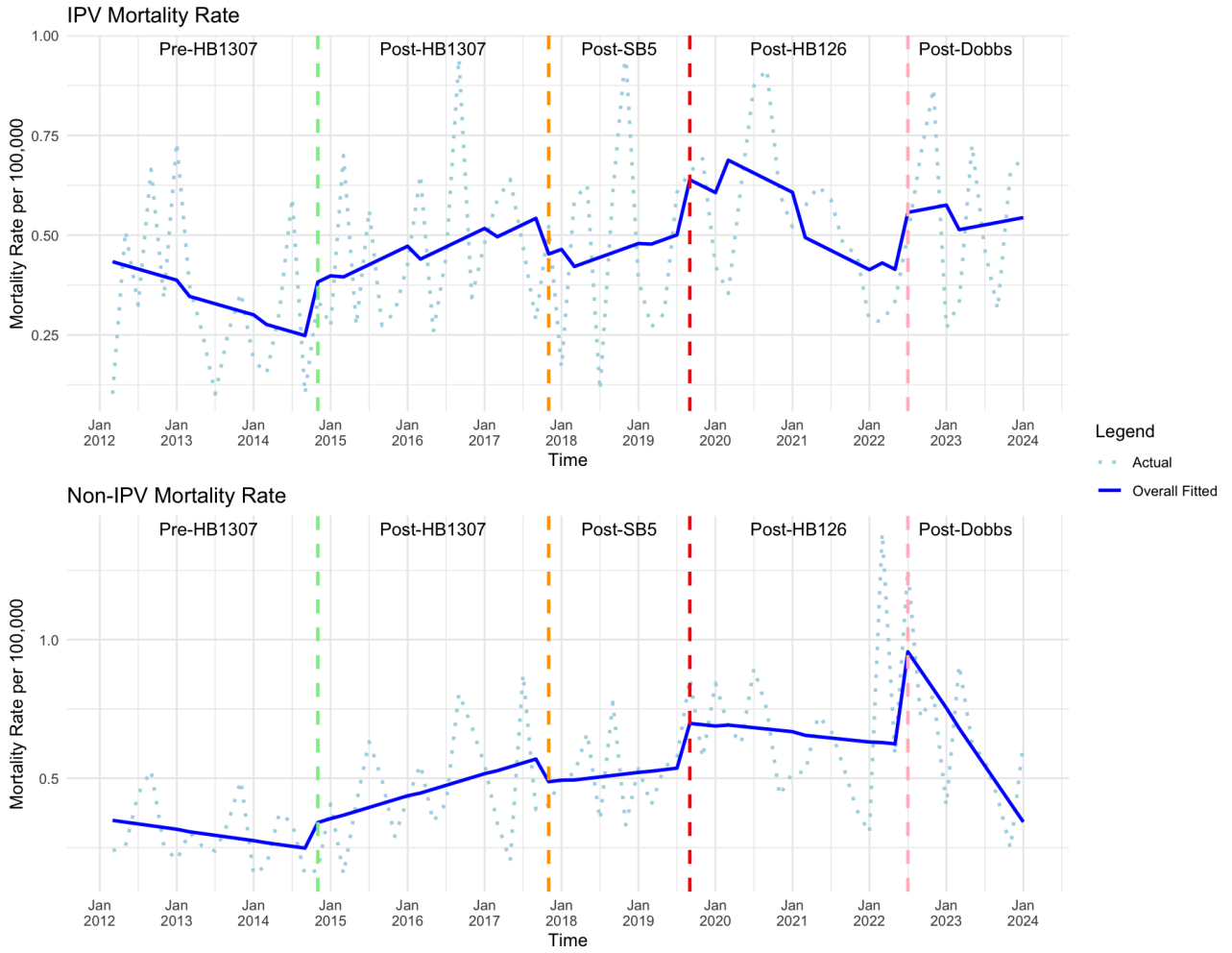
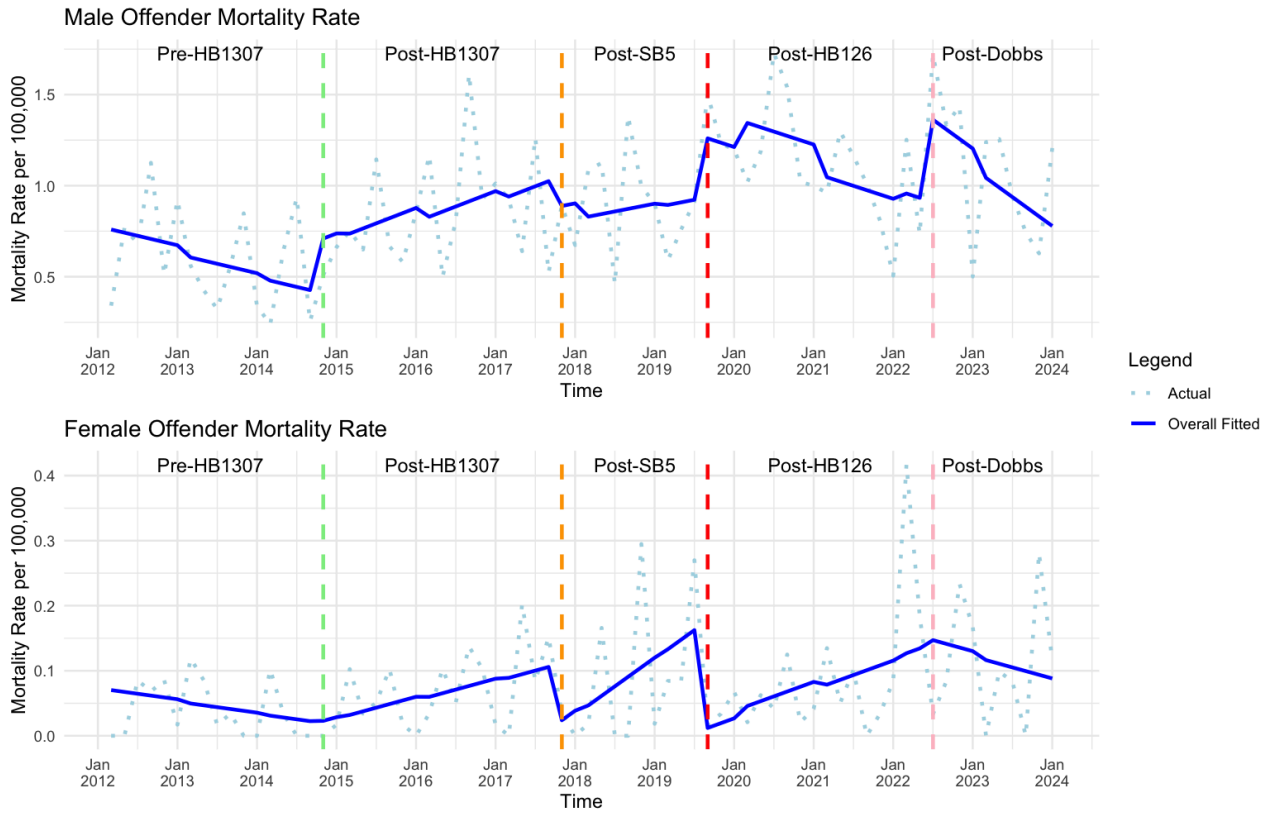


Figure 6. Gender of Offender

Homicide Mortality Rate Trends among Women and Girls Aged 14-55 by Method in Missouri 2012-2023



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