

# Suicide Prevention Effects of Extreme Risk Protection Order Laws in Four States

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More than half of suicide deaths in the United States result from self-inflicted firearm injuries. Extreme risk protection order (ERPO) laws in 21 states and the District of Columbia temporarily limit access to firearms for individuals found in a civil court process to pose an imminent risk of harm to themselves or others. Research with large multistate study populations has been lacking to determine effectiveness of these laws. This study assembled records pertaining to 4,583 ERPO respondents in California, Connecticut, Maryland, and Washington. Matched records identified suicide decedents and self-injury method. Researchers applied case fatality rates for each suicide method to estimate nonfatal suicide attempts corresponding to observed deaths. Comparison of counterfactual to observed data patterns yielded estimates of the number of lives saved and number of ERPOs needed to avert one suicide. Estimates varied depending on the assumed probability that a gun owner who attempts suicide will use a gun. Two evidence-based approaches yielded estimates of 17 and 23 ERPOs needed to prevent one suicide. For the subset of 2,850 ERPO respondents with documented suicide concern, comparable estimates were 13 and 18, respectively. This study's findings add to growing evidence that ERPOs can be an effective and important suicide prevention tool.

**J Am Acad Psychiatry Law 52(3) online, 2024. DOI:10.29158/JAAPL.240056-24**

**Key words:** extreme risk protection orders; gun violence prevention; suicide; red flag laws

More than 800,000 lives were lost to suicide in the United States in the past two decades, over half of

them resulting from self-inflicted firearm injuries.<sup>1</sup> A continuing rise in the nation's suicide rate has coincided with an increase in the proportion of suicides that involve firearms, the most lethal method of intentional self-injury.<sup>2</sup> Interventions that can effectively keep guns out of the hands of people at imminent risk of harm to themselves or others should be a key component of an effective public health effort to reduce the number of these preventable tragedies.<sup>3-5</sup> That being said, in a nation where private ownership

Published online August 20, 2024.

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Disclosures of financial or other potential conflicts of interest: None.

of firearms is commonplace, culturally rooted, and to some extent constitutionally protected, interventions designed to prevent firearm injuries by limiting at-risk individuals' access to firearms must carefully balance public safety goals with other considerations.<sup>6</sup>

In the context of health care encounters, gun safety interventions for individuals at risk of suicide ideally would be voluntary and would engage these individuals in reducing firearm access as part of their treatment plan; options include implementing safe firearm storage, either in the home or out of the home, so that the person of concern no longer has access. Many individuals at high risk of suicide do not come to the attention of health care providers or would not be open to voluntary approaches to reduce lethal means access. To the extent that extreme risk protection orders (ERPOs) can help ensure safety for individuals who pose a risk of intentional self-injury with a firearm, for whatever reason or motivation, these legal tools offer a versatile and promising intervention to prevent suicides.<sup>7</sup>

Specifically, an ERPO is an individualized, risk-based, time-limited civil restraining order that, following due process of law, temporarily makes firearms legally inaccessible for the duration of the order, removing guns and prohibiting their purchase for an individual deemed by a court to pose an imminent risk of harm to self or others.<sup>8</sup> For such a person at a time of high risk, an ERPO is designed to foreclose the most lethal method of injury. The question of whether ERPOs actually save lives is not settled. What follows is a report of new empirical evidence from a study of firearm-related suicide and other suicide outcomes in 4,583 individual respondents to ERPOs in four states (California ( $n = 1,386$ ), Connecticut ( $n = 1,407$ ), Maryland ( $n = 1,347$ ), and Washington ( $n = 443$ )) using matched death records to address the question of whether ERPOs have been effective in preventing suicide deaths.

### Firearm Suicide and the Rationale for ERPOs

Features of the epidemiology of suicide in the United States provide a compelling rationale for ERPOs as an important suicide-prevention tool. Suicides in the United States were on the wane in the 1980s through the 1990s, but the 21st century marked a disturbing reversal of that trend.<sup>1</sup> Although mortality from most other causes declined, the suicide rate climbed by more than 30 percent for the next two decades, reaching a record annual high of nearly 50,000 deaths

in 2022. Suicide increased fastest in nonurban areas and among younger people.<sup>1</sup> Suicide now ranks as the second leading cause of death among those aged 10 to 34.<sup>1</sup> Easy access to firearms has played a significant role in the trajectory of the nation's suicide epidemic. Between 2019 and 2021, when the nation saw a large increase in firearm sales and the number of first-time gun owners,<sup>9</sup> the nonfirearm suicide rate declined whereas the firearm suicide rate increased by eight percent in the population in the United States overall and increased by 18 percent among adolescent to young adult males living in the nonurban South.<sup>1</sup>

Many factors may contribute to suicidal acts (neurobiological vulnerabilities, psychological distress, experiences of loss, social pressures and isolation, peer and social media influences, economic strain, and cultural norms), but the enabling factor of access to lethal means often makes the difference between suicidal behavior and suicide mortality.<sup>10</sup> On average, approximately nine out of ten people who attempt suicide survive nonfirearm methods of self-injury,<sup>11</sup> and those who survive are unlikely to die from suicide in a subsequent attempt.<sup>12</sup> In contrast, firearm-involved suicide attempts are rarely survivable; only about one out of ten people survive,<sup>11</sup> and those few who survive are often left with severe disability.<sup>13</sup> These statistics highlight a remarkable public health opportunity to reduce the suicide rate through policies such as ERPO laws that limit access to firearms specifically for persons known to be at risk of suicide.

In 2021, an estimated 12.3 million adults in the United States had serious thoughts of suicide, 1.7 million made a suicide attempt,<sup>14</sup> and just under 50,000 died.<sup>1</sup> Although firearms are involved in only a small proportion of suicide attempts (about 5%),<sup>15</sup> they account for a large proportion of suicide deaths (about 52%).<sup>1</sup> From a public health perspective, then, although it is a difficult long-term challenge to mitigate the deleterious causal factors, both distal and proximal, that incline people to self-injurious behavior, a more immediate and effective way to stop so many people from dying is to limit access to firearms for people at manifest risk of harm to self, whatever their motivation. Research suggests that only a small minority of individuals who are prevented from suicide through denial of access to a firearm will substitute an alternative method and eventually die from suicide.<sup>12</sup> Also, as already suggested, the large majority of survivors of suicide attempts die of other causes later in life. Risk does not inevitably lead to harm.

ERPOs are designed as a public health-oriented law that does not restrict the rights of law-abiding gun owners unless they are deemed to be a danger to themselves or others.<sup>16</sup> ERPOs fall within a small class of constitutionally permissible, politically tenable, narrowly focused legal or regulatory schemes that can disqualify individuals from purchasing or possessing firearms (for example, having a record of involuntary civil commitment or a felony criminal conviction).<sup>17</sup> A key difference between ERPOs and these other laws is that ERPOs impose a short-term disqualification whereas the others typically confer lifetime disqualifications. These other gun-prohibiting criteria have long been recognized as legitimate constraints on the right to bear arms as set forth in Justice Antonin Scalia's opinion in *District of Columbia v. Heller* (2008), to the effect that "the right secured by the Second Amendment is not unlimited" (Ref. 18, p 626).

As of May 2024, 21 states and the District of Columbia have enacted ERPO laws. All states' ERPO statutes authorize law enforcement to initiate an ERPO.<sup>19</sup> Some states also authorize family members, clinicians, educators, or other categories of individuals to initiate an ERPO by petitioning a court directly when they observe someone engaging in behaviors demonstrating risk of firearm violence. Most ERPO statutes provide a two-step legal process beginning with an *ex parte* order for firearm removal in exigent or emergency circumstances, followed by a timely opportunity for a court hearing between seven days and one month following the temporary ERPO, depending on the state. The respondent may be represented by a lawyer in ERPO proceedings, although most states do not pay for a respondent's lawyer.

At an ERPO hearing, the state has the burden of proving that the individual continues to pose a substantial risk of harming self or others. If a judge finds such evidence sufficient to grant the order according to statutory criteria, a local law enforcement agency or licensed firearm dealer retains the ERPO respondent's firearms for no longer than a year, in most states. An ERPO also prohibits the respondent from purchasing firearms for the duration of the order. After an ERPO has been issued, a respondent may request a hearing to reconsider the order. The terms of such requests vary among the states.

ERPOs are civil orders that carry no criminal implications unless they are violated. ERPOs were initially designed as a risk-based public safety intervention

that could be applied most appropriately to people without criminal legal involvement. In practice, however, ERPOs are being used in different kinds of cases in conjunction with criminal law enforcement and prosecution. Specifically, ERPOs have been used in response to criminal incidents involving firearms, cases where police make an arrest or have probable cause to make an arrest, and where prosecutors exercise discretion in proceeding with a criminal case or withhold or withdraw charges. In this regard, ERPOs can be seen in different contexts as either a form of criminal diversion or enhanced law enforcement. There are legal and public health policy arguments for and against the use of ERPOs in these ways. More research is needed on both their effectiveness and fairness.

ERPO laws were designed to provide robust due process protections, including the requirement for a timely court hearing following an *ex parte* order, the opportunity for the respondent to be represented by a lawyer, and the state having the burden of proof, typically by the standard of clear and convincing evidence. Such due process protections are considered especially important for ERPOs to the extent that these laws regulate and restrict individuals' rights based on judgements of future risk and are not a sanction for prior injurious behavior. Legal scholars Joseph Blocher and Jacob Charles examined the features of ERPO laws in relation to constitutional requirements for prehearing deprivation of rights, Supreme Court guidelines for seizures prior to a full hearing, standard of proof principles, and burden of proof in the context of extreme risk; they concluded that ERPOs fit well within the established constitutional due process framework.<sup>16</sup>

Subsequently, in the aftermath of the Supreme Court's 2022 decision in *New York State Rifle and Pistol Association v. Bruen*,<sup>20</sup> new legal challenges to ERPOs arose, especially regarding due process concerns with gun seizure under an *ex parte* order prior to a hearing. Following the *Bruen* opinion, lower courts must now utilize a new method of scrutiny, viewing such challenges solely through the lens of the "text, history, and tradition" of the constitution and thus by appealing to historical analogs or precedents in past laws. This new test and diverging interpretations of its applicability to various firearm restrictions brought a season of uncertainty in gun rights jurisprudence, both with respect to the Second Amendment and due process protections<sup>19,21</sup>.

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**Table 1** Features of ERPO Statutes in California, Connecticut, Maryland, and Washington

ERPO Statutory Characteristics	CA	CT	MD	WA
Categories of authorized ERPO petitioners				
Law enforcement officers	X	X	X	X
Family or household members	X	<sup>a</sup>	X	X
Licensed clinicians and mental health care providers		<sup>a</sup>	X	
Others: employers, coworkers, dating partners, people who have a child in common, and certain school personnel	X			
Standard of proof for <i>ex parte</i> orders				
Probable, reasonable, or good cause	<sup>b</sup>	X	X	X
Substantial likelihood	<sup>b</sup>			
Standard of proof for final orders				
Preponderance of the evidence				X
Clear and convincing evidence	X	X	X	X
Duration of <i>ex parte</i> orders				
1–2 days			X	
14 days	X		X	
21 days	X			
Duration of final orders				
Up to one year	<sup>b</sup>	<sup>a</sup>	X	X
1–5 years	X			
Until respondent initiates review in which either law enforcement determines no probable cause of a risk or the state fails to prove by clear and convincing evidence at hearing that there is a risk		X		

ERPO = extreme risk protection order

<sup>a</sup> In Connecticut, prior to June 1, 2022, only law enforcement and state officials could petition for an order; thereafter, family and household members could petition for an investigation by law enforcement that can result in law enforcement petitioning for an order. The law changed after the study was completed. During the study period, duration of the ERPO was up to 1 year.

<sup>b</sup> In California, the standard of proof for temporary orders is “probable cause” for orders petitioned by law enforcement only and “substantial likelihood” for orders petitioned by family and law enforcement. During the study period, duration of the ERPO was up to 1 year.

Most recently, in its first post-*Bruen* gun rights case, *United States v. Rahimi*,<sup>22</sup> the Supreme Court held that when an individual has been found by a court to pose a credible threat to the physical safety of another, that individual may be temporarily disarmed consistent with history and without running afoul of the Second Amendment. The *Rahimi* decision reaffirmed the constitutionality of federal laws restricting access to firearms for respondents to domestic violence restraining orders issued after notice and a hearing. While the opinion did not explicitly address ERPOs or *ex parte* proceedings, its reasoning suggests that risk-based restrictions adjudicated in a civil court proceeding can be constitutionally permissible, especially when based on a court’s individualized determination of a credible threat. Although the *Rahimi* decision also did not address the potential due process concerns that some critics of ERPOs have raised, academic legal analysis has concluded that ERPOs fit comfortably within the constitution’s protections of an individual’s right to a hearing prior to a lasting deprivation of a protected interest.<sup>16</sup>

Table 1 summarizes key statutory features of ERPO laws in the four states that were included in the study.

By legal design, the qualifying criteria for an ERPO do not require a mental illness diagnosis and with good reason; ERPOs focus on emergent indicators of risk of imminent harm to self or others, irrespective of the cause or source of the risk. Despite stigmatizing public opinion to the contrary,<sup>23,24</sup> the large majority of people with diagnosable mental illnesses are not at risk of violent behavior directed at others as a result of their illness.<sup>25</sup> That being said, acute mental illness is a significant risk factor for suicide, and a substantial proportion of ERPO respondents are described in ways that suggest, implicitly or explicitly, that they are experiencing a mental health crisis. A Connecticut study found that law enforcement officers detained and transported 55 percent of ERPO respondents to a hospital emergency department, ostensibly for evaluation and treatment of an acute behavioral health condition.<sup>26</sup> Moreover, 46 percent of respondents in the study had a diagnosable behavioral health disorder recorded in the state’s public behavioral health system; three out of four of those with a matched

record had a mental health diagnosis, either alone or co-occurring with a substance use disorder, and the remainder had a substance use disorder only.<sup>26</sup>

Critics of ERPOs sometimes lament that an ERPO does nothing to address the underlying causes of dangerous behavior but merely mitigates risk associated with exposure to firearms. For their part, proponents of ERPO laws describe this focus as appropriate; by reducing firearm exposure specifically for people at high risk, the chance of a lethal outcome is lessened and an opportunity opens for other interventions that can address a person's motivation for self-harm. Evidence from ERPO implementation studies shows that, when law enforcement serves an ERPO and finds the respondent to be in a mental health crisis, they often proceed to deliver the individual to a hospital emergency department for evaluation and continuing treatment, as needed.<sup>26</sup> A longstanding body of state laws, separate from ERPO laws, provides police officers with the authority to detain and transport an individual who shows signs of mental disorder and dangerousness.<sup>27</sup> In many cases, then, ERPOs not only can provide a second chance at life but a window of time and opportunity for respondents in crisis to access therapeutic or other interventions that could address their underlying motivations for suicide.

An emerging body of research has described the implementation of ERPO laws in a handful of states and local jurisdictions, but effectiveness studies have been limited.<sup>28–32</sup> Early studies examined suicide outcomes in small samples of individuals exposed to risk-based firearm-removal laws in Connecticut ( $n = 762$ ) and Indiana ( $n = 395$ ).<sup>26,33</sup> These studies linked ERPO respondent databases to state death records and identified individuals who had later died of suicide, whether by firearm injury or other methods. Using a counterfactual analysis based on case fatality rates (CFRs), these studies estimated that for every 10 to 20 firearm removal actions, one life was saved by averting a suicide.

Kivisto and Phalen later compared trends in population-level suicide rates in Connecticut and Indiana with trends in synthetic control states without ERPO laws. Using a quasiexperimental analysis, these researchers estimated that Indiana's gun removal law was associated with a 7.5 percent reduction in gun suicides over 10 years and that Connecticut's law was associated with a 13.7 reduction in the "post-Virginia Tech period."<sup>34</sup> A commentary by Swanson discussed the uncertainty of this type of study's conclusions with respect to

population-level outcomes, given the relatively small number of individuals actually exposed to the law's restrictions.<sup>35</sup>

Another synthetic control study in San Diego County did not find a significant effect of ERPOs in reducing population rates of violent crime and suicide.<sup>36</sup> Still, given that only a small number of ERPOs had been issued (355 orders over a period of four years in a population of 2.6 million), it is hardly surprising that statistically significant population-level effects could not be detected.<sup>37</sup>

For this article, we used the same analytic method that Swanson and collaborators described in their studies conducted in Connecticut and Indiana.<sup>26,33</sup> The advantage of the current study is that the estimates of effectiveness of ERPOs are based on a much larger and more diverse sample of ERPO respondents combined across four states.

## Method

This study is part of a larger project<sup>32</sup> analyzing ERPO use and outcomes associated with ERPO laws in California (Cal. Penal Code § 18,100–18,205), Connecticut (Conn. Gen. Stat. § 29-38c), Maryland (MD Code, Public Safety § 5–6), and Washington (RCW 7.94). These states were selected to reflect at least some of the geographic and statutory diversity that characterizes ERPO states and to take advantage of access to ERPO data in certain states where academic institutions and prominent researchers in gun violence prevention and policy had existing working relationships with each other and with state entities empowered to provide such data to researchers. Colorado and Florida were included in the larger study but excluded from the current analysis of suicide outcomes owing to limitations of available data. In Colorado, there were not enough ERPO cases to support a valid study of suicide outcomes. In Florida, we were unable to obtain death record data. In California and Washington, public records requests allowed us to obtain ERPO casefiles. The Connecticut data were made available to us through a collaborative arrangement between the site investigators and relevant state agencies. In Maryland, we were granted access to nonpublic ERPO court records. All requests were made for ERPO cases through June 30, 2020, but the start date varied by state, depending on when the law went into effect.<sup>32</sup>

We obtained death records from each state's vital records repository (typically housed in the Department

of Health) to identify ERPO respondents who had died. In California, we used Lexis Nexis to identify decedents and then obtained their death certificates to determine cause of death. For decedents who were matched in the search, we merged variables containing the date and cause of death with the larger study database. For suicide cases, we also obtained the specific mechanism of injury.

Trained research associates coded ERPO petitions and the attached supporting affidavits to classify descriptive information about the respondents, including the reasons that an ERPO had been requested from the court. Each research associate double-coded petitions with a lead coder until they reached an interrater reliability score of .80. This study protocol was approved by the institutional review boards at Michigan State University, Johns Hopkins Bloomberg School of Public Health, University of Washington, University of California Davis, Yale University, Duke University, and the Connecticut Department of Mental Health and Addiction Services.

We followed the method of counterfactual analysis that was used in Swanson and collaborators' previous single-state studies of ERPOs' effectiveness in preventing suicide.<sup>26,33</sup> Specifically, we used published case fatality rates (CFRs) for each method of suicide to extrapolate the number of nonfatal suicide attempts that had likely occurred to produce the corresponding number of recorded deaths among ERPO respondents. Published national CFRs were as follows: ingesting poison or cutting or piercing with a sharp object, one percent fatality; intentional drug overdose, two percent; jumping from a high place or in front of a moving vehicle or object, 28 percent; gas inhalation, 31 percent; hanging, 53 percent; drowning, 56 percent; and self-inflicted firearm injury, 90 percent fatality.<sup>11</sup>

We then used the CFR-extrapolated estimates of suicide attempts to create an alternative data array under the counterfactual assumption that these respondents had not been subject to an ERPO and had access to firearms. The analysis also relies on an evidence-based assumption regarding the probability that, in the absence of ERPO, the average ERPO respondent who attempted suicide would have used a firearm rather than some other method of self-injury. For this probability, we applied our previously published estimate of  $p = .39$ .<sup>26</sup> That probability estimate was initially calculated from a state-level regression analysis of its linear association with states' household firearm possession rate.

We applied that result to the counterfactual array to estimate the number of excess fatalities that could have been expected in the absence of gun removal and ultimately the number of granted ERPO petitions needed to prevent one suicide. We conducted the analysis first for the entire pooled study population and then for the subset of 2,850 ERPO respondents with a documented suicide concern as part of their initial ERPO petition.

We also calculated the number of ERPOs needed to prevent one suicide using an alternative estimate of the probability that a male gun owner who attempts suicide will use a gun, an estimate that does not rely on a state-level ecological correlation. In a recent article, Matthew Miller and his colleagues recalculated the probability in question by applying CFRs to a database of suicide death records pertaining to a large number of known handgun owners in California.<sup>38</sup> They calculated the probability to be approximately 28 percent. In what follows, we present the estimate of the number of ERPOs needed to prevent one suicide using both of these probability assumptions (our original 2017 estimate and Miller and colleagues' updated version) set within a range of possible estimates on a curve.

In addition, we calculated the ratio of firearm-involved suicides to all suicides (FS/S) among ERPO respondents and compared that with an evidence-based counterfactual that could have been expected in the absence of an ERPO. In general, higher proportions of gun suicides are associated with higher absolute suicide rates, because of the high lethality of firearm suicide attempts relative to attempts with other methods.<sup>11</sup> Because the large majority of ERPO respondents are male gun owners,<sup>26,30,33,36,39</sup> an informative comparison for the counterfactual can be made to suicide decedents in largely male gun-owning populations. We used data on suicide methods reported by the Centers for Disease Control and Prevention (CDC) for males in five states in the South and Mountain West with the highest rates of firearm ownership: Alabama, Louisiana, Mississippi, Montana, and Wyoming. In those populations, approximately 70 percent of male suicides involve firearms.<sup>1</sup>

## Results

The study population of ERPO respondents was drawn from California ( $n = 1,386$ ), Connecticut ( $n = 1,407$ ), Maryland ( $n = 1,347$ ) and Washington ( $n = 442$ ), for a total of 4,583 ERPO respondents in

**Table 2** Counterfactual Estimation of Number of ERPOs Needed to Prevent One Suicide Death

Suicide Method	Observed Number of Suicide Deaths and Extrapolated Estimate of Suicide Attempts			Counterfactual Estimates				Total
				Suicide Attempts		Suicide Deaths		
	Observed Suicides, by Method	National Case Fatality Rate (CFR)	Estimated Suicide Attempts, by Method	Firearm	Other Method	Firearm	Other Method	
Firearm	20	0.90	22.3	22.3	—	20.0	—	20.0
Drug or poison	8	0.02	416.0	162.2	253.8	146.0	4.9	150.9
Suffocation	12	0.42	28.9	11.3	17.6	10.1	7.3	17.5
Cutting	2	0.01	283.2	110.4	172.7	99.4	1.2	100.6
Jumping	2	0.28	7.2	2.8	4.4	2.5	1.2	3.7
Other	1	0.02	58.2	22.7	35.5	20.4	0.6	21.1
Total	45		815.8	331.8	484.0	298.5	15.3	313.8
						Expected		313.8
						Observed		45.0
						Lives saved		268.8
						ERPOs		4,583.0
						Number of ERPOs per life saved		17.1

CFR = case fatality rate; ERPO = extreme risk protection order

the pooled database. The petitioners in these cases were as follows: Connecticut, 100 percent law enforcement; California, 97.6 percent law enforcement; Maryland, 56.8 percent law enforcement, 31.7 percent intimate partner, 7.4 percent other family, 3.6 percent “other”; and Washington, 88.8 percent law enforcement, 5.3 percent intimate partner, 4.4 percent other family.

In the pooled study population, 45 individuals went on to die by suicide, 20 by firearm injury and 25 by other methods. Ninety-one percent of all the suicide decedents were male (44 of 45), and 97 percent of the firearm suicide decedents (24 of 25) were males. The average age of respondents in the study was 43.7 years. By extrapolating from published national case fatality rates (CFRs) for each method of suicide recorded,<sup>11</sup> we estimated that there were approximately 22 firearm suicide attempts (.44% of the study population) at 90 percent lethality resulting in the 20 firearm suicide deaths observed. Using the same method, we estimated that there were 794 suicide attempts by other methods (15.1% of study population), ranging from one percent to 42 percent lethality across methods used, resulting in 25 other suicide deaths (see Table 2).

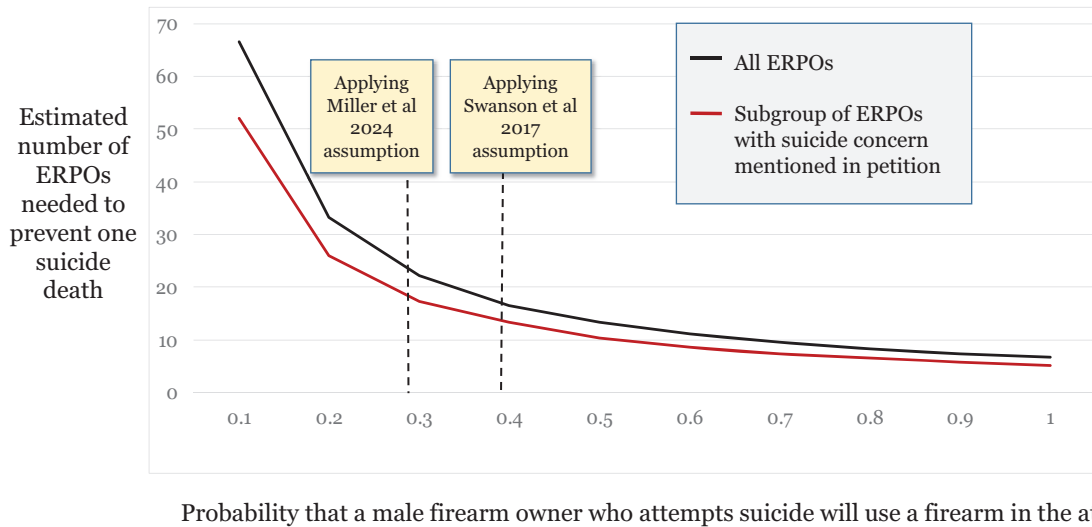
Following the method described by Swanson and collaborators,<sup>26</sup> we initially assumed a probability of  $p = .39$  that a male gun owner who attempts suicide will use a gun in his attempt, and we further assumed that, but for the ERPO, the respondent would have had access to firearms. Accordingly, we reassigned 39 percent of counterfactual suicide attempts for

each method of suicide to firearms with a CFR of 90 percent and the remaining 61 percent to the less lethal method observed for each case as reported. Recalculating from the counterfactual CFR distribution the number of deaths that hypothetically would have occurred without the ERPO, we estimated 315 hypothetical expected deaths in the counterfactual. Subtracting the 45 observed deaths, we estimated that there were 269 averted suicide deaths attributable to the ERPO intervention. Dividing the total number of ERPOs in the pooled four-state study population by the estimated number of lives saved, we calculated that, for every 17 ERPOs, one potential suicide death was prevented, as shown in Table 2.

We conducted the same analysis on the smaller group of ERPO respondents in which there had been an indication of suicide ideation or attempt coded in the ERPO petition. Specifically, there were 2,850 ERPO respondents with a baseline suicide concern (with or without violent threats directed at others as well) in the pooled database. Within that subgroup, our death record match identified 19 firearm-involved suicides and 19 suicides by other methods, totaling 38 suicide deaths. Using the aforementioned method, we estimated that there were 21 firearm suicide attempts at 90 percent lethality resulting in the 19 firearm-involved deaths. Likewise, we estimated that there were 630 suicide attempts by other methods combined, with an average of three percent lethality resulting in 19 observed nonfirearm suicide deaths.

Recalculating from the counterfactual CFR distribution the number of deaths that hypothetically

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**Figure 1.** Association between the probability that a male gun owner who attempts suicide will use a firearm in the attempt and the estimated number of ERPOs needed to prevent one suicide death: evidence from 4,583 ERPOs in four states. ERPO = extreme risk protection order.

would have occurred without an ERPO in the subgroup with a suicide concern, we estimated 252 hypothetical expected deaths in the counterfactual compared with 38 observed deaths in the data, for an estimated 214 averted suicide deaths. As before, we divided the total number of ERPOs in the subgroup by the estimated number of lives saved in this group to calculate our estimate that, for every 13 ERPOs issued in cases involving a known suicide risk, one life was saved.

Using Miller and colleagues<sup>38</sup> alternative estimate of the probability that a male gun owner who attempts suicide will use a gun, the estimated number of ERPOs needed to avert one suicide in these data are 24 for the whole sample and 18 for the subset with a suicide concern mentioned in the petition. Figure 1 displays the curvilinear relationship between the assumed probability that a male gun owner who attempts suicide will use a gun and the number of ERPOs needed to prevent one suicide. The higher curve represents all ERPO respondents in the study, and the lower curve represents the subset of ERPO respondents for whom a suicide concern was documented in the ERPO petition.

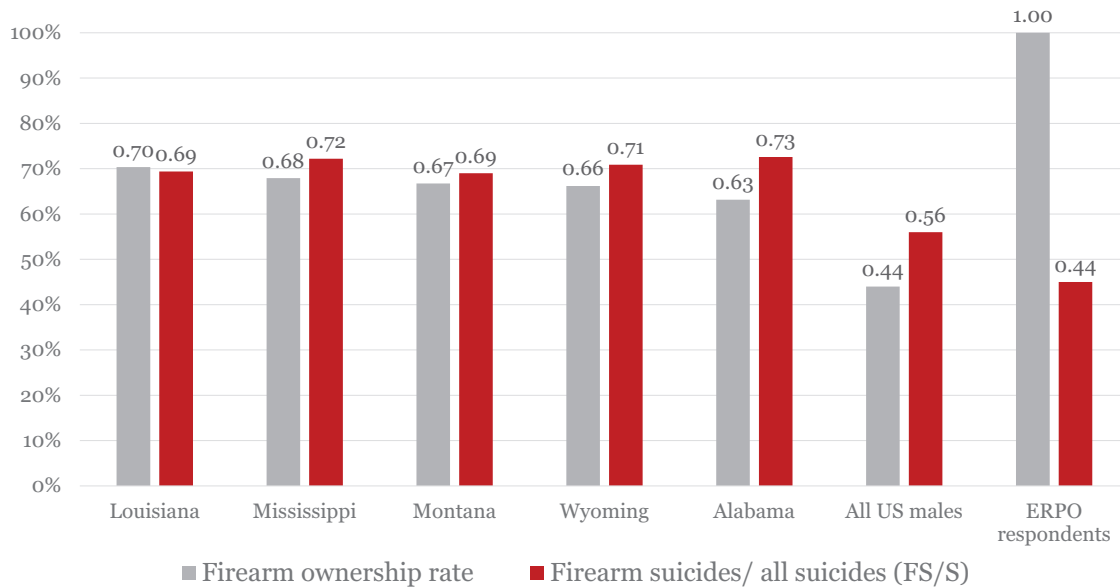
As further evidence consistent with ERPO effectiveness in suicide prevention, Figure 2 displays the close correspondence between the state-level firearm possession rate and the proportion of male suicides that involved firearms (FS/S) in five states with the highest rates of gun ownership,<sup>39</sup> compared with ERPO respondents, who are depicted as having 100 percent firearm ownership prior to

their ERPO. Even though not every ERPO case resulted in a gun removal, most of them did, and the assumption justifying the ERPO is that the person could have obtained access to a gun without the ERPO. The gap between the assumed pre-ERPO (or without ERPO) gun ownership rate and the post-ERPO FS/S ratio is consistent with the ERPO having an effect by removing firearms from individuals at risk of suicide. That the FS/S ratio was still 44 percent suggests that ERPO respondents, as a group, were not entirely deterred from accessing firearms in making a suicide attempt. There may also have been problems in effectively removing firearms in some cases.

## Discussion

In this study of suicide outcomes for 4,583 ERPO respondents in four states, we identified a pattern in the frequency of methods of self-injury among suicide decedents, suggesting that a substantial number of respondents made nonfatal suicide attempts using other methods instead of a firearm. Our study did not observe or measure nonfatal suicide attempts directly. Still, using established data on case fatality rates for different suicide methods and an evidence-based counterfactual assumption regarding the probability that a firearm would have been used if it had not been removed by the ERPO, we estimated that ERPOs likely contributed to the prevention of approximately 269 suicides over an average observation period of two years per respondent, which translated to one





**Figure 2.** Firearm ownership rate and proportion of male suicides that involve guns in selected high gun ownership states, U.S. adult males, and in ERPO respondents. ERPO = extreme risk protection order; FS/S = firearm suicides to all suicides.

life saved for every 17 ERPOs issued. In the subset of 2,850 ERPO cases with a documented suicide concern in the ERPO petition, we calculated that ERPOs likely contributed to preventing 214 suicides: one life saved for every 13 ERPOs. These estimates are consistent with published findings from our previous research in Connecticut and Indiana.<sup>26,33</sup>

The parameters of any ERPO policy's application to any local population at risk (the mix of respondents, the reasons for issuing the order, and the resulting outcomes) are likely to vary across states and local jurisdictions. Larger factors external to the policy could also play a role: factors such as the restrictiveness of complementary state gun laws, the targeting priorities of local ERPO implementers, the prevalence of crime involving firearms, the ambient supply of firearms on secondary and illegal markets, and cultural attitudes about suicide and firearms. Regional ERPO practice may also change and evolve over time. The assumption regarding the probability that a gun owner who attempts suicide will use a gun could vary as well. Hence, the number of ERPOs needed to avert one suicide should not be considered as a single objective quantity discoverable by research but may vary with the features of ERPO programs as they are being implemented in the real world. For this reason, we also present the findings in the form of a curve.

It is important to note that, despite receiving an ERPO, 20 individuals in the study went on to die of suicide with a firearm, accounting for 44 percent of

suicide deaths in the study population. There are alternative ways to evaluate the significance of this finding. On the one hand, this percentage is substantially lower than in other predominantly male populations of gun owners, where typically about 70 percent of suicides involve firearms, and thus lower than would be expected had the ERPO not been in place. On the other hand, 20 suicides with guns in a group selected for intervention precisely because of their dangerous behaviors suggests that ERPOs, as currently implemented, do not always work to prevent suicide. It is worth noting that only eight of these gun suicides occurred during the period when the ERPO was active, whereas the rest happened after the respondents became eligible to have their guns returned, suggesting that perhaps ERPOs should have been renewed for these respondents.

Clearly, some individuals who are intent on ending their life can still die of suicide even with an ERPO in place, and this calls attention to the importance of ensuring that firearm dispossession occurs when ERPOs are served and that ERPOs are included in background check systems to prevent new gun purchases. This finding also highlights the need for a person at risk of suicide to receive appropriate social, medical, or psychiatric support; firearm removal alone does not address the underlying problems that drive self-injurious behavior. Also, procedural changes could be instituted, such as a required risk assessment before expiry of the ERPO, with renewal indicated if evidence of

risk remains. Finally, these results suggest the need to address the problem of illegal access to firearms; too many individuals who should not have a gun can obtain one on the secondary or illegal market without undergoing a background check at a licensed gun dealer.

### Study Limitations

This study's results should be considered in light of its methodological and data limitations. Many other factors in addition to ERPOs could have contributed to the patterns we observed in the suicide data. Confidence intervals around the estimated number of lives saved could not be calculated. The study population was drawn from four states, which may not be generalizable to all ERPO states. We did not have a direct measure of suicide attempts but relied on estimates calculated by extrapolating from published case fatality rates for each suicide method. Those published rates, in turn, come from selected medical record data on patients who were seen in emergency departments or hospitalized with a diagnosis of an intentional self-inflicted injury; in some cases, it is difficult to determine whether a patient intended to die, and suicide attempts not resulting in an emergency department visit would not contribute to the analysis.<sup>11</sup> Also, our analysis depended on an indirect (albeit evidence-based) estimate of the probability that an average male gun owner who attempts suicide would use a firearm in the attempt. As mentioned earlier, the large majority (80–90%) of ERPO respondents are male, but clearly not all. An error in this estimate based on males, in either direction, would result in a higher or lower estimate of the number of lives saved by ERPOs. Our estimate of ERPO effectiveness in preventing suicides did not account for the benefit that might have accrued to would-be suicide attempters who, as a result of getting help in conjunction with their ERPO, did not make a suicide attempt with any method. Had we been able to include an estimate of the benefit of not attempting suicide at all, rather than merely the benefit of selecting a more survivable method than a firearm, the calculated life-saving effect of ERPO would have been stronger.

### Conclusion

ERPOs would work better if more could be done to reduce the ambient supply of firearms to which an ERPO respondent can still gain access, such as guns

sold and resold on the secondary or illegal markets, not subject to a background check, or otherwise accessed or stolen from legal firearm owners. ERPOs would have a bigger impact if more people on the frontlines of responding when people are behaving dangerously and at risk of suicide or interpersonal violence (e.g., clinicians, law enforcement) knew about them and used them, so they could be scaled up and applied to a larger proportion of the population at high risk of gun violence and suicide. Further research is needed to assess more directly the impact of ERPOs and the effectiveness of different approaches to their implementation, as ERPOs are increasingly being brought to scale in a number of states and local jurisdictions.<sup>41,42</sup> Clearly, ERPOs alone are not a panacea for preventing firearm injury and mortality in the United States, but they are an important piece in the puzzle of gun violence prevention, and this study adds to the evidence suggesting they have saved lives.

### Acknowledgments

The research presented in this article was funded by a grant from the National Collaborative on Gun Violence Research. Dr. Swanson's work was supported additionally by a grant to Duke University from the Elizabeth K. Dollard Charitable Trust.

Drs. Kapoor and Norko acknowledge the salary support of the Connecticut Department of Mental Health and Addiction Services (DMHAS). The work described in this article was funded in part by the State of Connecticut, DMHAS, but this publication does not express the views of DMHAS or the State of Connecticut. The views and opinions expressed are those of the authors.

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