



OPEN ACCESS

Gun violence restraining orders in California, 2016–2018: case details and respondent mortality

Veronica A Pear ,¹ Rocco Pallin,¹ Julia P Schleimer ,¹ Elizabeth Tomsich,¹ Nicole Kravitz-Wirtz ,¹ Aaron B Shev,¹ Christopher E Knoepke ,^{2,3} Garen J Wintemute¹

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/injuryprev-2022-044544>).

¹Department of Emergency Medicine, University of California Davis School of Medicine, Sacramento, California, USA

²Adult and Child Consortium for Outcomes Research and Delivery Science, University of Colorado Denver School of Medicine, Aurora, Colorado, USA

³Division of Cardiology, University of Colorado School of Medicine, Aurora, Colorado, USA

Correspondence to

Dr Veronica A Pear, Department of Emergency Medicine, University of California Davis School of Medicine, Sacramento, California, USA; vapear@ucdavis.edu

Received 3 February 2022

Accepted 1 April 2022

Published Online First

2 June 2022

ABSTRACT

Background Gun violence restraining orders (GVROs), implemented in California in 2016, temporarily prohibit individuals at high risk of violence from purchasing or possessing firearms and ammunition. We sought to describe the circumstances giving rise to GVROs issued 2016–2018, provide details about the GVRO process and quantify mortality outcomes for individuals subject to these orders ('respondents').

Methods For this cross-sectional description of GVRO respondents, 2016–2018, we abstracted case details from court files and used LexisNexis to link respondents to mortality data through August 2020.

Results We abstracted information for 201 respondents with accessible court records. Respondents were mostly white (61.2%) and men (93.5%). Fifty-four per cent of cases involved potential harm to others alone, 15.3% involved potential harm to self alone and 25.2% involved both. Mass shooting threats occurred in 28.7% of cases. Ninety-six and one half per cent of petitioners were law enforcement officers and one-in-three cases resulted in arrest on order service. One-year orders after a hearing (following 21-day emergency/temporary orders) were issued in 53.5% of cases. Most (84.2%) respondents owned at least one firearm, and firearms were removed in 55.9% of cases. Of the 379 respondents matched by LexisNexis, 7 (1.8%) died after the GVRO was issued: one from a self-inflicted firearm injury that was itself the reason for the GVRO and the others from causes unrelated to violence.

Conclusions GVROs were used most often by law enforcement officers to prevent firearm assault/homicide and post-GVRO firearm fatalities among respondents were rare. Future studies should investigate additional respondent outcomes and potential sources of heterogeneity.

INTRODUCTION

Firearms are the most common means of homicide and suicide in the USA.¹ Many acts of firearm violence are preceded by implicit or explicit threats, including two-thirds of public mass violence.² Despite these warning signs, law enforcement officers in most states cannot remove firearms from individuals at risk of violence who are not already prohibited from possessing firearms. Extreme risk protection order (ERPO) laws were created to fill this legal gap.

Called gun violence restraining orders (GVROs) in California, these laws provide a civil mechanism

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Prior research suggests that risk-based temporary firearm removal laws similar to gun violence restraining orders (GVROs) have been primarily used to prevent firearm suicide, for which they appear to be effective tools. Effectiveness for preventing interpersonal violence is unknown.

WHAT THIS STUDY ADDS

⇒ In California, GVROs have been mostly used in cases of threatened interpersonal violence. No respondent deaths were caused by violence occurring after the GVRO was issued, suggesting that the law may be effective in preventing fatal firearm violence.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Findings can inform policymakers and practitioners about how to best design and implement GVROs and may also help researchers generate hypotheses regarding GVROs' potential for multimodal violence prevention.

to temporarily prohibit individuals from possessing and purchasing firearms and ammunition during periods of heightened risk of self- or other-directed harm.³ As of May 2022, 19 states and the District of Columbia have passed an ERPO-type law, the vast majority of which were enacted in the past 5 years.

These orders show promise for preventing suicide^{4,5} and possibly mass shootings,⁶ but implementation has been slow and variable across jurisdictions in California.⁷ In addition, there are legitimate concerns about whether ERPOs, which can provide a life-saving, non-criminal solution to threats of firearm violence, are being used in ways that exacerbate racial and class-based inequities.^{8–10} We previously presented demographic information on individuals subject to GVROs—hereafter, 'respondents'—in California over the first 4 years of implementation using the California Department of Justice's (CA DOJ) restraining order data.⁷ Investigating case circumstances, respondent risk factors and violent outcomes provides a richer understanding of GVRO implementation and use as well as a foundation for identifying emerging inequities. This is particularly important now that



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Pear VA, Pallin R, Schleimer JP, et al. *Inj Prev* 2022;**28**:465–471.

President Biden has called on Congress to incentivise state adoption of ERPO laws and to pass a national law.¹¹

The aim of the current study is to characterise GVRO cases in California in the first 3 years of implementation, 2016–2018. Using court case files and mortality data, we describe the circumstances that gave rise to these GVROs, provide details about the GVRO process and assess respondent mortality outcomes. We also compare demographic characteristics of respondents with those of the general population and the population of legal firearm owners (to whom GVRO respondents may be more similar) in order to identify whether any groups are conspicuously over-represented or under-represented. Findings will be of interest to policymakers, practitioners involved with GVRO implementation and firearm violence researchers.

METHODS

GVRO process

During the study period, law enforcement, family and household members were permitted to petition for a GVRO. There are three types of GVROs: emergency orders, lasting 21 days and available only to law enforcement; temporary orders, also lasting 21 days but available to all petitioners; and orders issued after a hearing, which lasted for 1 year during the study period (and up to 5 years beginning September 2020). Respondents are required to relinquish their firearms and ammunition to law enforcement or a licensed firearm dealer within 24 hours of being served an emergency or temporary order. When a short-term order is issued, a hearing is scheduled 21 days later, wherein a judge determines whether the respondent still poses a danger to themselves or others and rules on whether the order should be extended, terminated or let to expire.

Data collection

We identified all respondents to GVROs filed 2016–2018 with data from the California Restraining and Protective Order System provided by CA DOJ. We used this information to request case records from individual county courts across the state. We completed these requests in November 2019 and received the last court file in March 2020.

We determined whether respondents were alive in the study period by querying LexisNexis Risk Solutions in August 2020. Cause of death was determined from death certificates from the California Department of Public Health (received in June 2021). Mortality data were linked to GVRO data using respondent name and date of birth.

Measures and analysis

From the court documents, we abstracted information on respondent demographics, circumstances resulting in the GVRO, respondent risk factors, the GVRO process, and firearm access and removal. We used Microsoft Forms to abstract basic case details from the GVRO forms and Dedoose qualitative software to abstract information from narratives found in the court documents. Although they vary in length and detail, case narratives are always provided by the petitioner, occasionally by other parties (eg, in supporting documents such as police reports) and rarely by the respondent (in a formal response to the order). Our codebook is included as online supplemental emethods.

A small team of analysts trained and oversaw two student assistants, who carried out the abstraction. Abstractors double coded all cases for the GVRO forms abstraction and a random 20% sample for the case narrative abstraction, crosschecking their coding for consistency. After double coding these cases, the

abstractors had reached consensus, allowing for single coding of the remaining narratives. Abstractors met with team members weekly to discuss questions, resolve discrepancies and refine the codebook.

We compared the demographics of respondents with two groups. While respondents need not have firearm access to qualify for a GVRO, we found that, in practice, they are very likely to be firearm owners (see the Results section). We, therefore, compared them to firearm owners in California using state-representative data from the 2018 California Safety and Wellbeing Survey.¹² To provide broader context, we compared them with the general state population using data from the American Community Survey.

We used descriptive statistics to summarise respondent and case details. Information provided in case narratives varied and was especially sparse in emergency GVROs. As a result, we could often only determine whether a given code was present in the narrative, and we cannot infer from its absence that it was absent in fact. Accordingly, we included all cases in the denominator when calculating percentages, including those with missing information. Thus, estimates represent the statistical floor (ie, the lowest estimate consistent with the data). Information on missingness is presented in online supplemental table 1.

Analyses were done in R (V.4.0.2), Stata (V.15.1) and Dedoose (V.8.3). This study was approved by the University of California, Davis Institutional Review Board. Neither patients nor the public were involved in the conduct of this study.

RESULTS

We requested court records for all 413 GVRO respondents and received 218 (online supplemental table 2). The vast majority (94.4%) of files not received were for cases in which an emergency order was the most recent GVRO issued, which courts usually could not locate. Emergency orders are used by officers in the field and issued by a judge remotely. They are single-page petitions with extremely limited case details and are commonly filed with the petitioning law enforcement agency rather than the court, making them particularly difficult to obtain. Seventeen respondents without GVRO forms in their court records were dropped from analysis. We coded a total of 202 cases for 201 respondents. Respondents with abstracted records tended to have more recent GVROs than those without, but they were otherwise similar (online supplemental table 3).

Respondent demographics

GVRO respondents were younger (median age: 39 years) and more likely to be men (93.5%) than other firearm owners in the state and the state population (table 1). The racial/ethnic distribution of GVRO respondents was mostly similar to that of the statewide firearm owning population, though differences in reporting did not allow for comparison of Asian Americans. Black individuals constituted a larger proportion of respondents (10.0%) than firearm owners overall (4.4%). At least 9.5% of respondents were veterans, which is about two times the statewide average (5.4%) but only one-third of the estimate for firearm owners (29.2%).

Case circumstances

Most (54.0%) cases involved a documented threat of harm to others alone, 15.3% involved a threat of harm to self alone and 25.2% included threats of both other-directed and self-directed harm (table 2). Among the nearly 80% of cases involving any other-directed threat, 29.4% included threats to intimate

Table 1 Characteristics of GVRO respondents, firearm owners and the state population

	GVRO respondents (2016–2018, n=201)*	Firearm owners 18+ (CSaWS 2018, n=429)†	California population 18+ (2016–2018 average)‡
Age, med (25th–75th pctl)	39 (28–52)	57 (45–67)	45 (31–60)
Minors, n (%)	6 (3.0)	NA	NA
Gender, n (%)			
Male	188 (93.5)	301 (72.9; 66.8–78.3)	14 930 504 (49.3)
Female	13 (6.5)	128 (27.1; 21.7–33.2)	15 363 490 (50.7)
Race/ethnicity, n (%)			
White	123 (61.2)	318 (64.1; 56.3–71.2)	12 347 188 (40.8)
Hispanic	35 (17.4)	71 (20.4; 14.6–27.8)	10 653 363 (35.2)
Black	20 (10.0)	16 (4.4; 2.0–9.3)	1 753 342 (5.8)
Asian American	10 (5.0)	NA	4 650 828 (15.4)
Other/unknown	12 (6.0)	24 (11.1; 6.8–17.7)	889 274 (2.9)
Urbanicity, n (%)§			
Metro, large	151 (75.1)	297 (67.5; 60.2–74.0)	28 470 430 (76.4)
Metro, medium	40 (19.9)	87 (24.9; 18.8–32.3)	6 759 323 (18.1)
Metro, small	3 (1.5)	16 (2.7; 1.5–4.6)	1 178 974 (3.2)
Non-metro	7 (3.5)	28 (4.9; 3.0–8.0)	845 229 (2.3)
Military service, n (%)			
Active duty	5 (2.5)	2 (0.5; 0.1–1.8)	127 777 (0.4)
Veteran	19 (9.5)	143 (29.2; 23.4–35.8)	1 618 861 (5.4)

*One respondent was missing age and one was missing race/ethnicity. 177 records (88.1%) did not mention military service, which could indicate lack of service or a lack of reporting.

†California Safety and Wellbeing Survey (CSaWS) percentages and 95% CIs are weighted to be representative of the non-institutionalised adult population of California. Minors are excluded from CSaWS and Asian American race is included in 'other'. One participant was missing county.

‡Age, gender and race/ethnicity estimates were obtained from the United States Census' State Population by Characteristics: 2010–2019 data. Military service and veteran information was obtained from the American Community Survey 2018 5 year estimates.

§Urbanicity was measured at the county level with the 2013 Rural–Urban Continuum Codes. All non-metropolitan codes were collapsed into a single non-metro category.

GVRO, gun violence restraining order.

partners and 20.6% included threats to other family members. Most threats were behavioural (55.4%) and/or verbal (51.5%), and just over one-third of threats involved brandishing or using a firearm. Slightly more than one-in-four cases involved threatened mass shootings (ie, a threat to shoot an unspecified number of people or ≥3 people other than oneself), including all six cases involving minors (who, in all cases, targeted schools). Nearly 60% of inciting events took place at a private residence and 24.3% took place at a public venue (including workplaces and schools).

We identified many known or hypothesised risk factors for violence in case narratives (table 3). The most common was substance use, including drugs and/or alcohol (34.2% of cases), which directly related to the GVRO inciting event in about a quarter of cases. The next most common risk factor was a loss or relationship problem relating to an intimate partner, which appeared in 22.8% of cases. Mental illness (indicated by a named diagnosis in the case file)—a risk factor primarily for suicide—appeared in about 20% of cases, as did prior police contact resulting in arrest. Information on prior violent behaviour was

Table 2 Circumstances of the inciting events leading to a GVRO

	Cases (n=202)* n (%)
Target of harm	
Others alone	109 (54.0)
Self alone	31 (15.3)
Self and others	51 (25.2)
Other-directed targets (n=160)†	
Intimate partner	47 (29.4)
Random people	37 (23.1)
Other family member	33 (20.6)
Someone at work	18 (11.2)
Someone at school	14 (8.8)
Other specific person	57 (35.6)
Threat details‡	
Any threat	173 (85.6)
Threatening behaviour	112 (55.4)
...with a firearm	69 (34.2)
...without a weapon	42 (20.8)
...with another weapon	13 (6.4)
Verbal threat	104 (51.5)
Mail/email/text threat	27 (13.4)
Threat posted on social media	11 (5.4)
Other	3 (1.5)
Potential mass shooting‡	
Yes	58 (28.7)
No	136 (67.3)
Terrorism investigation	
Yes	3 (1.5)
No	192 (95.0)
Sociopolitical or religious motivation	
Yes	7 (3.5)
No	186 (92.1)
Location	
Private residence	119 (58.9)
Workplace	30 (14.9)
Internet	13 (6.4)
Public place	12 (5.9)
School	7 (3.5)
Child present	
Yes	34 (16.8)
No	161 (79.7)

*201 unique respondents; one person had two distinct GVROs. Percentages are calculated with unknown (missing) values in the denominator.

†Categories are not mutually exclusive. Threat details were coded as (1) if present and otherwise left blank (0), so we cannot distinguish between 'no' and 'unknown'.

‡A potential mass shooting was defined as a threat to shoot an unspecified number of people or at least three people other than oneself.

GVRO, gun violence restraining order.

less common, ranging from 5.4% with a history of self-harm to 10.4% with a history of intimate partner violence perpetration.

Process details

Over 95% of petitioners were law enforcement officers (table 4). Petitioners often cited evidence obtained from interacting with the respondent (50.0%) or information provided by the respondent's family members (32.7%), significant other (27.7%) or bystanders (22.3%) in the petition. At the time of police contact

Table 3 Respondent risk factors

	Cases (n=202)* n (%)
Prior violence†	
Self-directed violence, behaviour	11 (5.4)
Self-directed violence, threat/ideation	30 (14.9)
Intimate partner violence, behaviour	21 (10.4)
Intimate partner violence, threat/ideation	12 (5.9)
Other-directed violence (not intimate partner), behaviour	14 (6.9)
Other-directed violence (not intimate partner), threat/ideation	19 (9.4)
Harming animals	2 (1.0)
Health-related risk factors‡	
Substance use	
GVRO-related	69 (34.2)
Background risk	54 (26.7)
Mental illness (named diagnosis)	
GVRO-related	32 (15.8)
Background risk	40 (19.8)
Undifferentiated paranoia/psychosis/hallucination	
GVRO-related	25 (12.4)
Background risk	22 (10.9)
Physical health problems	
GVRO-related	22 (10.9)
Background risk	10 (5.0)
Dementia/cognitive impairment	
GVRO-related	18 (8.9)
Background risk	6 (3.0)
Not adhering to prescription medication regime at the time of the GVRO	
GVRO-related	14 (6.9)
Background risk	3 (1.5)
Criminal legal system contact	
Prior police contact with arrest/charges	2 (1.0)
Prior police contact without arrest/charges	28 (13.9)
Current restraining/protective orders	7 (3.5)
Prior restraining/protective orders	3 (1.5)
Social/structural risk factors‡	
Loss/relationship problems, intimate partner	
GVRO-related	46 (22.8)
Background risk	42 (20.8)
Unemployment/employment problems	
GVRO-related	23 (11.4)
Background risk	24 (11.9)
Loss/relationship problems, not intimate partner	
GVRO-related	13 (6.4)
Background risk	13 (6.4)
Social isolation/alienation	
GVRO-related	16 (7.9)
Background risk	8 (4.0)
Housing instability	
GVRO-related	11 (5.4)
Background risk	9 (4.5)
Engagement with hate groups/propaganda	
GVRO-related	4 (2.0)
Background risk	6 (3.0)

*201 unique respondents; one person had two distinct GVROs. These risk factors were coded as (1) if present and otherwise left blank (0), so we cannot distinguish between 'no' and 'unknown'.

†Prior violence refers to violence that occurred before the GVRO inciting event. Violent behaviours are actions that cause harm or could cause harm, such as cutting or hitting. Violent threats are threats that are communicated to others (eg, verbally, in writing, in pictures). Violent ideations are thoughts about harming others or one's self.

‡In contrast to GVRO-related risk factors, background risk factors are not directly related to the GVRO inciting event.

GVRO, gun violence restraining order.

or GVRO service, nearly one-third of respondents were arrested on criminal charges and just under one-fourth were placed on an involuntary psychiatric hold. Police use of force (including

Table 4 GVRO process details

	Cases (n=202)* n (%)
Petitioner relationship to respondent	
Law enforcement officer	195 (96.5)
Family/household member	7 (3.5)
Source of information to petitioner†	
Respondent	101 (50.0)
Family or household member	66 (32.7)
Significant other	56 (27.7)
Bystander/witness	45 (22.3)
Law enforcement (not including petitioner)	38 (18.8)
Medical personnel	24 (11.9)
Friend	25 (12.4)
Coworker	13 (6.4)
Social media	13 (6.4)
School employee	11 (5.4)
Other	6 (3.0)
Police action at contact/service‡	
Arrest on criminal charges	66 (32.7)
5150 (involuntary psychiatric hold)	46 (22.8)
Transport to hospital	45 (22.3)
Use of force	10 (5.0)
Psychiatric evaluation (on site)	5 (2.5)
Order after a hearing	
Issued	108 (53.5)
Sought but not issued	20 (9.9)
Not sought	67 (33.2)
Legal representation at hearing (among those with an order after a hearing form, n=104‡)	
Petitioner only	55 (52.9)
Respondent only	4 (3.8)
Petitioner and respondent	15 (14.4)
None	28 (26.9)

*201 unique respondents; one person had two distinct GVROs. Percentages are calculated with unknown (missing) values in the denominator.

†These were coded as (1) if present and otherwise left blank (0), so we cannot distinguish between 'no' and 'unknown'.

‡The order after a hearing form was missing for four cases in which we believe the order after a hearing was granted (based on court minutes and other forms in the file) and for all cases in which it was sought but not granted.

GVRO, gun violence restraining order.

compliance holds, pointing a firearm at the respondent and the use of 'less lethal weapons' like bean bag rounds and tasers) was noted in 5.0% of cases. The 1-year order after a hearing was issued in 53.5% of cases, sought but not issued in 9.9% of cases and not sought in 33.2% of cases. Petitioners were far more likely to have legal representation than respondents at the hearing for the 1-year order (67.3% vs 18.3%, respectively). Additional process details are presented in online supplemental table 4.

Firearm access and recovery

Based on information in the court documents, the majority (84.2%) of respondents owned a firearm at the time of the inciting event, and a small number had access to another's firearm (4.5%) or were in the 10-day waiting period after purchasing a firearm (2.5%; table 5). Firearm removal was documented in 55.9% of cases, with a total of 653 firearms removed. Of these cases, firearms were primarily recovered by law enforcement (85.8%).

Table 5 Firearm details

Among all respondents (n=202)*...	n (%)
Firearm access/ownership†	
Access, owner	170 (84.2)
Access, not owner	9 (4.5)
Purchased, in waiting period	5 (2.5)
Intends to purchase	2 (1.0)
No known access	12 (5.9)
Work-related firearm access‡	8 (4.0)
Any firearm removal pursuant to GVRO‡	113 (55.9)
Any known firearms not recovered‡	24 (11.9)
Among respondents with removals (n=113)...	
Total firearms removed	653
Median (25th–75th pctl) no. firearms removed/person	2 (1, 4)
Undocumented firearms recovered§	
Yes	27 (23.9)
No	78 (69.0)
Cases with additional firearms not recovered‡	13 (11.5)
Type of firearms removed	
Any handguns	
Yes	96 (85.0)
No	13 (11.5)
Any long guns	
Yes	53 (46.9)
No	54 (47.8)
Any assault-type weapons	
Yes	33 (29.2)
No	73 (64.6)
Mechanism of firearm recovery	
Law enforcement	97 (85.8)
Licensed firearm dealer	9 (8.0)
*201 unique respondents; one person had two distinct GVROs. Percentages are calculated with unknown (missing) values in the denominator.	
†Categories are mutually exclusive. Individuals were classified according to the most proximal ownership/access category that applied.	
‡These were coded as (1) if present and otherwise left blank (0), so we can't distinguish between 'no' and 'unknown'.	
§Undocumented firearms are those that the State did not know the respondent possessed (based on firearm transaction records).	
¶GVRO, gun violence restraining order.	

While most cases with a firearm removal included handguns, a substantial number (29.2%) included assault-type weapons (see online supplemental emethods for identification guidelines). Finally, case records indicated that at least one firearm owned by or accessible to the respondent was not recovered in 11.9% of cases.

Respondent mortality

LexisNexis was able to match 379 (91.8%) of the 413 total GVROs respondents, 2016–2018. Among these, seven (1.8%) died after being issued a GVRO. All were white men over 45 years old (mean=62.7 years). One died by firearm suicide; however, the GVRO was issued *in response to* the self-inflicted gunshot wound that ultimately resulted in his death. Three deaths were from unintentional injuries (drowning, overdose and motor vehicle crash) and the others were from unrelated medical conditions.

DISCUSSION

In this study, we elucidated precipitating circumstances for GVROs, process details and respondent outcomes using court records and mortality data for GVRO respondents in California, 2016–2018. This is the first detailed description of GVRO cases in the state and both complements and extends our previous study on uptake of the law.⁷ These findings provide insight into GVRO use, respondent mortality and areas for improvement in implementation.

We found that most GVROs involved risk of harm to others, which was present in nearly 80% of cases—about two times the percentage of cases involving risk of self-directed harm. This differs from the experience of other states and counties that have reported details of the use of ERPO-type laws. In Oregon, Connecticut and King County, Washington, the proportion of cases involving self-directed harm was higher than the proportion involving other-directed harm, sometimes substantially so.^{5 13 14} Washington State, Colorado and Broward County, Florida had more other-directed than self-directed harm cases, but the difference between the two proportions was smaller (7%–19%) than in California (nearly 40%).^{15–17} This unique pattern of use in California may reflect a lower prevalence of suicide in the underlying population: the rate of firearm suicide in California is among the lowest in the country (although this is also true of Connecticut).¹ Additionally, the ratio of firearm homicide to firearm suicide in California is almost 1:1,¹⁸ whereas nationwide, it is closer to 1:2.¹⁹ California also has more stringent firearm regulations than other states, including prohibitions following an involuntary mental health hold, which may reduce the need for GVROs in cases involving suicidality. Finally, differences could stem from variation in the type of cases for which petitioners believe GVROs are best suited.

The most common violence-related risk factor identified in the court records was substance use, present in over one-third of cases. This proportion is similar to that found in Broward County, Florida, but lower than that reported in Washington and Oregon (46%–47%).^{13 15 17} Substance use is a well-established risk factor for violent and suicidal behaviour.^{20–22} Other common risk factors present in the case files included mental illness (a risk factor primarily for suicide), prior arrest, and relationship loss/problems, each present in about 20% of cases. Many of these risk factors suggest that the respondent may have had contact with healthcare or social services that could have provided help prior to the inciting event. It would be prudent to consider how these early contacts could be used to help alleviate issues before they escalate to the point where a GVRO is needed, such as through identification of substance use problems and timely referral to affordable treatment programmes, counselling and clinician-initiated conversations about firearm access with patients at high risk of violence.^{23 24}

Our findings regarding the GVRO process raised several potential concerns. We found that nearly one in three respondents were arrested on criminal charges at the time of police contact for the inciting event or during GVRO service. This is much greater than the 17% of respondents arrested in Connecticut and 8% in Marion County, Indiana.^{4 5} This may reflect the higher proportion of cases in California that are for threatened other-directed harm, which can involve criminal offences like threats, assault or domestic battery. Key informants in California previously suggested arrests and GVROs can sometimes be complementary, such as when individuals at risk for violence would otherwise have access to firearms after posting bail.⁹ However, there may be cause for concern if GVROs, which

are civil mechanisms, are leading to arrests. If they are used punitively without complementary social service resources, family and friends may be discouraged from alerting law enforcement to potentially dangerous situations out of fear of enmeshing the person at risk in the criminal legal system.

We also found that the 1-year order after a hearing was not sought in one-third of cases. When it was sought, the 1-year order was issued 84% of the time. In all, just over 50% of cases resulted in an order after a hearing (this would be lower if we had received court records for the emergency orders that courts were unable to locate). In contrast, about 80% of cases in Washington State and Colorado and 87% in Broward County, Florida resulted in long-term orders following a hearing.^{15–17} Reasons for this difference should be further explored but suggest variation in use or case circumstances, with California cases perhaps reflecting shorter-term, acute crises.

Our findings regarding orders after a hearing raised another potential concern: of respondents with a hearing, only 18.3% had legal representation. Key informants previously noted that this could perpetuate class-based disparities in the legal system,¹⁰ with wealthier respondents more often avoiding the order after a hearing than others. We do not have data on respondent income, but a slightly higher proportion of cases in which the respondent had a lawyer resulted in the order after a hearing being denied when it was sought (18.5% vs 14.9%). Given the small number of respondents with a lawyer, this can only be taken as suggestive.

An additional indication that implementation can be improved is that firearms known to law enforcement were not recovered in 12% of cases—two times the 5% reported in King County, Washington.¹⁴ Firearms may go unrecovered for many reasons, including being sold, stolen, lost or hidden and due to lack of officer follow-up when they are stored outside of the respondent's home. This undermines the purpose of the order and presents a clear safety concern; we suggest law enforcement agencies create and/or review strategies to locate and recover outstanding firearms.

Our findings also highlight ways in which GVROs may have prevented suicide among respondents, 40.6% of whom were issued a GVRO for reasons including a threat of self-harm. One respondent died by suicide using a firearm, but the injury was inflicted *during the inciting event* that resulted in the GVRO, before the order had been issued. No other respondents in the first 3 years of implementation died by suicide post-GVRO, using firearms or other means. Around 3% of respondents died by suicide after being issued a risk warrant (another risk-based temporary firearm removal law) in Connecticut and Marion County, Indiana, yet the laws in those states were found to be effective at preventing firearm suicide.^{4 5} These studies are not directly comparable to ours, though, as they had longer follow-up periods. We had a small number of respondents and a short period of follow-up and cannot infer causation between the order and subsequent lack of suicide, but these findings are promising nevertheless.

Limitations

This study had several limitations. We did not receive court files for all GVRO cases issued during the study period. Cases consisting only of emergency orders were under-represented in our data and our findings may not generalise to them. However, we received nearly all files with an order after a hearing, which likely represent the cases with the most enduring need for intervention.

Additionally, we were limited by the information included in the case files. Much of the contextual information, such as respondent risk factors and the circumstances precipitating the order, came from narratives included in the petition. Petitioners used their judgement about what details were pertinent and drew on different sources of information depending on who they contacted.

Finally, we were limited to evaluating mortality only among respondents, who threatened self-harm in about 40% of cases. The case files did not include the necessary individual-level information needed to link mortality data to other individuals threatened by respondents, so these mortality outcomes remain uncertain. In the future, GVRO researchers will need to consider how best to evaluate outcomes among those who primarily make threats against others.

CONCLUSIONS

GVROs in California, 2016–2018, were used primarily to prevent other-directed harm, including mass shootings. While our findings raised some concerns, we also found evidence suggestive of success: in particular, no suicides occurred post-GVRO. Future research should examine cases in more recent years, as uptake increased dramatically in 2019.⁷ It should also examine differences by race/ethnicity to identify potential indicators of inequitable use.⁸ Finally, given that GVROs are primarily being used to prevent assaultive violence in California, there is a pressing need for additional effectiveness evaluations examining this type of firearm violence.²⁵

Acknowledgements We thank Albert Hu and Annie Adachi for their work in requesting and abstracting GVRO court case files.

Contributors GJW conceived of the study. VAP, RP, JPS, ET, NK-W, CEK and GJW drafted the codebook for data abstraction. VAP, RP, JPS and ET oversaw data abstraction and acquisition. VAP analysed the data and drafted the manuscript. All authors made substantial contributions to interpreting the data and revising the manuscript. VAP is responsible for the overall content of the study as guarantor.

Funding This work was supported by the Fund for a Safer Future (NVF FFSF UC Davis GA004701) and the California Firearm Violence Research Center (no award number).

Disclaimer The funders played no role in the design and conduct of the study; collection, management, analysis and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study was approved by the University of California, Davis Institutional Review Board.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement No data are available. No data are publicly available.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Veronica A Pear <http://orcid.org/0000-0002-2462-3785>

Julia P Schleimer <http://orcid.org/0000-0001-6439-7586>

Nicole Kravitz-Wirtz <http://orcid.org/0000-0002-7827-0196>

Christopher E Knoepke <http://orcid.org/0000-0003-3521-7157>

REFERENCES

- 1 Web-Based injury statistics query and reporting system. National center for injury prevention and control, centers for disease control and prevention. 2005, 2020. Available: www.cdc.gov/injury/wisqars [Accessed 26 Aug 2021].
- 2 Mass attacks in public spaces, 2019. United States secret service, National threat assessment center, us department of homeland security, 2020. Available: www.secretservice.gov/data/press/reports/USSS_FY2019_MAPS.pdf
- 3 Cal. Penal code §18100-18205.
- 4 Swanson JW, Easter MM, Alanis-Hirsch K, et al. Criminal justice and suicide outcomes with Indiana's Risk-Based gun seizure law. *J Am Acad Psychiatry Law* 2019;47:188–97.
- 5 Swanson JW, Noriko MA, Lin H. Implementation and effectiveness of Connecticut's risk-based gun removal law: Does it prevent suicides? *Law Contemp Probl* 2017;80:179–208.
- 6 Wintemute GJ, Pear VA, Schleimer JP, et al. Extreme risk protection orders intended to prevent mass shootings: a case series. *Ann Intern Med* 2019;171:655–8.
- 7 Pallin R, Schleimer JP, Pear VA, et al. Assessment of extreme risk protection order use in California from 2016 to 2019. *JAMA Netw Open* 2020;3:e207735.
- 8 Swanson JW. The color of risk protection orders: gun violence, gun laws, and racial justice. *Inj Epidemiol* 2020;7:46.
- 9 Pallin R, Tomsich E, Schleimer JP, et al. Understanding the circumstances and stakeholder perceptions of gun violence restraining order use in California: a qualitative study. *Criminol Public Policy* 2021;20:755–73. doi:10.1111/1745-9133.12560
- 10 Pear VA, Schleimer JP, Tomsich E, et al. Implementation and perceived effectiveness of gun violence restraining orders in California: a qualitative evaluation. *PLoS One* 2021;16:e0258547.
- 11 Fact sheet: Biden-Harris administration announces initial actions to address the gun violence public health epidemic. the white house, 2021. Available: www.whitehouse.gov/briefing-room/statements-releases/2021/04/07/fact-sheet-biden-harris-administration-announces-initial-actions-to-address-the-gun-violence-public-health-epidemic/ [Accessed 01 May 2021].
- 12 Kravitz-Wirtz N, Pallin R, Miller M, et al. Firearm ownership and acquisition in California: findings from the 2018 California safety and well-being survey. *Inj Prev* 2020;26:516–23.
- 13 Zeoli AM, Paruk J, Branas CC, et al. Use of extreme risk protection orders to reduce gun violence in Oregon. *Criminol Public Policy* 2021;20:243–61.
- 14 Frattaroli S, Omaki E, Moloczniak A, et al. Extreme risk protection orders in King County, Washington: the epidemiology of dangerous behaviors and an intervention response. *Inj Epidemiol* 2020;7:44.
- 15 Rowhani-Rahbar A, Bellenger MA, Gibb L, et al. Extreme risk protection orders in Washington : A statewide descriptive study. *Ann Intern Med* 2020;173:342–9.
- 16 Barnard LM, McCarthy M, Knoepke CE, et al. Colorado's first year of extreme risk protection orders. *Inj Epidemiol* 2021;8:59.
- 17 Drane K. Preventing the next Parkland: A case study of the use and implementation of Florida's extreme risk law in Broward County. Giffords Law Center to Prevent Gun Violence, 2020. Available: <https://lawcenter.giffords.org/preventing-the-next-parkland-a-case-study-of-broward-countys-use-and-implementation-of-floridas-extreme-risk-law/>
- 18 Pear VA, Castillo-Carniglia A, Kagawa RMC, et al. Firearm mortality in California, 2000-2015: the epidemiologic importance of within-state variation. *Ann Epidemiol* 2018;28:309–15.
- 19 Wintemute GJ. The epidemiology of firearm violence in the twenty-first century United States. *Annu Rev Public Health* 2015;36:5–19.
- 20 Boles SM, Miotto K. Substance abuse and violence: a review of the literature. *Aggression and Violent Behavior* 2003;8:155–74.
- 21 Poorolajal J, Haghtalab T, Farhadi M, et al. Substance use disorder and risk of suicidal ideation, suicide attempt and suicide death: a meta-analysis. *J Public Health* 2016;38:e282–91.
- 22 Lynch FL, Peterson EL, Lu CY, et al. Substance use disorders and risk of suicide in a general US population: a case control study. *Addict Sci Clin Pract* 2020;15:14.
- 23 Wintemute GJ, Betz ME, Ranney ML. Yes, you can: physicians, patients, and firearms. *Ann Intern Med* 2016;165:205–13.
- 24 Pallin R, Spitzer SA, Ranney ML, et al. Preventing firearm-related death and injury. *Ann Intern Med* 2019;170:ITC81–96.
- 25 Pear VA, Wintemute GJ, Jewell NP, et al. Firearm violence following the implementation of California's gun violence restraining order law. *JAMA Netw Open* 2022;5:e224216.