

Child Access Prevention Laws and Firearm Storage: Results From a National Survey



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Introduction: Child Access Prevention Negligent Storage (CAP-NS) laws seek to reduce pediatric firearm injury by imposing sanctions on gun owners if children gain access to unlocked guns. Whether these laws affect the storage behavior they aim to encourage is not known because historical panel data on firearm storage do not exist. As a result, assessing how much, if at all, firearm storage changed because of CAP-NS laws requires an indirect approach.

Methods: Data for this study came from a web-based survey conducted by the research firm Ipsos from July 30, 2019 to August 11, 2019. Respondents were adult gun owners drawn from an online sampling frame comprising approximately 55,000 U.S. adults recruited using address-based sampling methods to be representative of the U.S. population. The primary outcome was the proportion of gun owners in CAP-NS versus non-CAP-NS states who had ≥ 1 unlocked firearm. Estimates are presented by CAP-NS status, for gun owners overall and for those who live with children, before and after adjusting for potential confounders. Data were analyzed in 2021.

Results: In adjusted analyses, gun owners in CAP-NS states were no more likely to lock firearms than were those in states without these laws. In addition, most gun owners reported not knowing whether they lived in a state with a CAP-NS law.

Conclusions: CAP-NS laws have at best modest effects on firearm storage. If the storage effect is as small as this study indicates, the mortality benefits previously attributed to CAP-NS laws are overstated. As such, developing interventions that effectively reduce firearm mortality by reducing access to firearms remains an urgent clinical and public policy priority.

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INTRODUCTION

As of January 1, 2021, a total of 17 states and the District of Columbia had adopted Child Access Prevention Negligent Storage (CAP-NS) laws (hereafter referred to as negligent storage or CAP-NS laws). Most states with CAP-NS laws enacted them in the early-to-mid 1990s.¹ An additional 12 states have reckless provision laws, sometimes considered CAP laws (but not CAP-NS laws), under which adults who recklessly or knowingly provide children with access to firearms may be criminally sanctioned. Only 2 states have passed CAP-NS laws in the past 2 decades (Washington in 2018; New Hampshire in 2001). Broadly, CAP-NS

laws seek to reduce pediatric firearm injury by imposing sanctions on gun owners if children gain access to unlocked guns.

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The rationale motivating CAP-NS laws is sound: youth suicide, the second leading cause of pediatric death, and unintentional firearm injury, a less frequent cause of pediatric mortality, are 3 times as likely for youth living in homes with unlocked guns, compared with youth in homes where all firearms are locked.^{2–4} A simulation study placed these relative risks in context: the youth firearm suicide rate would decrease by 1% for every 2% of gun-owning households with children that newly locked all previously unlocked firearms.³ Given that approximately half of U.S. gun-owning homes with children have an unlocked firearm,⁵ if 60% rather than 50% of gun-owning households with children stored all household firearms locked (i.e., a relative change of 20%), the youth firearm suicide rate would be 10% lower.

Most pre–post evaluations of CAP-NS laws have focused on estimating the effect these laws have on mortality rates among children and adolescents, the population CAP-NS laws seek to protect.^{6–9} In general, these studies have found that CAP-NS laws are associated with large (10%–35%) reductions in youth firearm suicide rates,^{8,9} youth unintentional firearm death rates,^{6,7} and youth firearm homicide rates.⁶ Some studies have found that CAP-NS laws decrease firearm suicide rates as much for young adults as for adolescents,^{6,10} and unintentional firearm death rates as much for older adults as for children.⁷ More modest reductions in rates of both firearm suicide and firearm homicide (a 5%–7% reduction by the sixth year after implementation) have been reported by researchers using Bayesian methods that, relative to methods used in other analyses, may reduce extreme effect size estimates and false positives.^{11,12} The primary effect reported in the Bayesian study was for the population overall; the effect on adolescents, reported in an appendix, was indistinguishable from that for the whole population.

The magnitude of the mortality benefit attributable to passage of CAP-NS laws should be commensurate with the storage changes induced by these laws. Direct assessment of how storage has changed, however, is not possible because state-level panel data on storage do not exist. This study takes an indirect approach: data from the 2019 National Firearms Survey are used to estimate the proportion of gun owners in CAP-NS states versus non-CAP-NS states who have ≥ 1 unlocked firearm (overall and separately for gun owners who live with children) before versus after adjusting for individual- and state-level characteristics that prior work suggests are associated with firearm storage practices (and that are imbalanced across states with versus without CAP-NS laws). Because the covariate-adjusted proportion of gun owners currently living in non-CAP-NS states who store ≥ 1 firearm unlocked reflects how gun owners in CAP-NS

states would have stored their firearms if their state, counter to fact, did not have a CAP-NS law, the difference between the observed storage in CAP-NS states and the adjusted storage in non-CAP-NS states estimates the effect of CAP-NS laws on storage today.

METHODS

Study Sample

Data for this study came from a web-based survey conducted by the research firm Ipsos from July 30, 2019 to August 11, 2019. Respondents were drawn from Ipsos's KnowledgePanel, an online sampling frame comprising approximately 55,000 U.S. adults recruited using address-based sampling methods. Samples are representative of the U.S. population.

The target population was non-institutionalized adults (aged ≥ 18 years) residing in the U.S. in gun-owning households. Whether panel members live in a home with firearms is a baseline characteristic collected by Ipsos; invitations to participate were restricted to those who had previously reported living in a home with firearms. Household and personal firearm ownership were confirmed for respondents who accepted the invitation to participate. A sample of 4,030 adults completed the survey. Gun owners and parents of adolescents were oversampled. This study focused on the 2,950 respondents who reported that they personally owned firearms.

Measures

Respondents were classified as living in a CAP-NS state based on their current state of residence. States were classified as CAP-NS states versus non-CAP-NS states based on data from the Gifford's Law Center.¹

Respondents were classified as believing that their state had a CAP-NS law based on the following questions. Respondents were first asked: *To the best of your knowledge, does your state have a law that imposes penalties on gun owners whose guns could be or are accessed by children? These laws, sometimes called Child Access Prevention laws or Safe Storage laws, may or may not require that a child's access results harm to self or others.* A total of 3 response options were offered: *yes*, *no*, and *don't know*. Respondents who answered *yes* were asked 4 additional questions to determine whether they believed that their state's law included provisions regarding firearm storage (Appendix Table 2, available online). Specifically, respondents were asked to indicate if the law in their state provides sanctions for when a child: (1) uses a gun that is unlocked/loaded to hurt or injure someone, (2) gains access to a gun that is unlocked/loaded, whether they use it to hurt or injure someone, (3) is likely to gain access to a gun that a gun owner had stored unlocked/loaded (whether the child gains access to it), or (4) is provided with a gun by a gun owner intentionally, knowingly, or recklessly. Respondents were told to choose all that applied. Respondents who chose (4) but not (1), (2), or (3) were classified as not thinking that their state had a CAP-NS law ($n=43$).

Gun owners were asked to enumerate how many guns they owned, how many were handguns, and how many were long guns, and separately for handguns and long guns in their home, how many were loaded and unlocked, loaded and locked up, unloaded and unlocked, and unloaded and locked up. Other

survey characteristics included in analyses were age, sex, race/ethnicity, education, census division, metropolitan statistical area, and whether the respondent lives with children aged <18 years. State-level firearm prevalence was based on estimates for 2016 (the most recent year available) using a recently validated proxy.¹³

Statistical Analysis

Analyses using survey weights provided by Ipsos accounted for survey nonresponse and under- or over-coverage imposed by the study-specific sample design. Weights also adjusted for benchmark demographic distributions (from the U.S. Census Current Population Survey or the American Community Survey). For population characteristics, such as gun ownership, that are not available in the Current Population Survey or American Community Survey, the survey was weighted to benchmark distributions of gun-owning households from weighted Ipsos data for sex, age, race/ethnicity, census region, metropolitan statistical area status, education, household income and presence of children in the home. STROBE reporting guidelines were followed.¹⁴ All analyses were conducted with Stata, version 16 using SVY suite commands.

To assess the research question—How do gun owners living in states with CAP-NS laws store their firearms today, compared with how they would have stored their firearms had their state never passed a CAP-NS law?—analyses adjusted for storage-related characteristics that were imbalanced across CAP-NS status. Specifically, analyses adjusted for the number of guns owned by the respondent, the type of guns owned (handgun, long gun, both), whether the owner had a concealed carry permit, the presence of children in the home, and household firearm prevalence in the respondent's state.^{5,13,15–18} Adjusted logistic regression of storage practices on CAP-NS status produced ORs that quantified the odds of storing ≥ 1 firearm unlocked in CAP-NS versus non-CAP-NS states after accounting for the aforementioned variables. To derive counterfactual storage in non-CAP-NS states that uniquely corresponded to AORs, 2 X 2 tables were constructed populating the cell counts for gun owners in CAP-NS states with the observed (unadjusted) proportion of unlocked versus locked guns (e.g., 55% lived in homes with unlocked firearms, 45% in homes where all firearms were locked). Next, storage among gun owners in non-CAP-NS states was adjusted to yield the unique cross product equal to the AOR.

Sensitivity analyses reclassified states as CAP-NS or not using the classification scheme developed by RAND and used by Schell et al.,¹² which differed minimally from the Gifford's Law Center's adjudication (Appendix Table 1, available online). Sensitivity analyses were run that excluded residents of New York, Nevada, and Washington because these states enacted CAP-NS laws <1 year before the survey. Results of all sensitivity analyses differed trivially from primary analyses and are not presented.

RESULTS

Of 6,721 invited panel members, 4,030 responded to the invitation and qualified (of whom 1,080 lived in households with guns but did not personally own any firearms). This study was limited to the 2,950 respondents

who reported that they personally owned ≥ 1 firearm. A total of 42% of gun owners lived in CAP-NS states.

Approximately one third of gun owners in both CAP-NS and non-CAP-NS states live with children (Table 1). Gun owners who live in states with CAP-NS laws are less likely to have concealed carry permits (32.2%, 95% CI=29.2, 35.5 vs 38.3%, 95% CI=35.4, 41.2), own both handguns and long guns (46.7%, 95% CI=43.4, 50.1 vs 53.9%, 95% CI=51.0, 56.7), and own ≥ 5 guns (20.1%, 95% CI=17.7, 22.9 vs 25.4%, 95% CI=22.9, 28.1).

A total of 26% of gun owners said they thought that they lived in a state with a CAP-NS law: 36.6% (95% CI=33.5, 40.0) of those who lived in a state with a CAP-NS law vs 18.1% (95% CI=15.9, 20.5) of those who lived in a state with no CAP-NS laws (Table 1). A total of 19% of gun owners reported that they thought they lived in a state with no CAP-NS laws: 15.3% (95% CI=12.9, 18.1) of those who lived in CAP-NS states and 22.4% (95% CI=20.0, 24.9) of those who lived in a state with no CAP-NS law. Most gun owners, 55% (95% CI=52.3, 56.8) overall, reported that they did not know whether their state had a CAP-NS law: 59.5% (95% CI=56.6, 62.3) in states without vs 48.1% (95% CI=44.7, 51.4) in states with a CAP-NS law.

Table 2 shows current storage practices by CAP-NS status, juxtaposed with estimates of (counterfactual) storage practices that gun owners in non-CAP-NS states would have had if they looked like their counterparts in CAP-NS states (i.e., after covariate adjustment, which should reflect how gun owners in CAP-NS states would have stored their firearms if their state, counter to fact, did not have a CAP-NS law). The modest unadjusted difference in unlocked storage by CAP-NS status was attenuated with adjustment. For example, in crude comparisons, 61.2% (95% CI=58.2, 64.1) of gun owners in states without CAP-NS laws stored ≥ 1 firearm unlocked, compared with 54.8% (95% CI=51.2, 58.3) in states with CAP-NS laws (a 6–percentage point difference, corresponding to an unadjusted OR of 0.78 [95% CI=0.64, 0.93]). After adjustment, there was only a nonsignificant 2–percentage point difference (52.7%, 95% CI=46.6, 58.9 vs 54.8%, 95% CI=51.2, 58.3), corresponding to an AOR of 1.09 (95% CI=0.85, 1.39). Similarly, in households with children, CAP-NS status was not significantly associated with storage after adjustment.

Gun owners who could not be affected by knowledge of CAP-NS laws directly because they reported either that their state did not have a CAP-NS law or that they did not know if their state had a CAP-NS law were more likely to store guns unlocked if they lived in a non-CAP-NS state (in unadjusted analyses, Table 2). After adjustment, however, the absolute difference by CAP-NS status was small and not significant: –1.5% overall (55.7%

Table 1. Characteristics of Gun Owners by State CAP-NS Law Status

Characteristics	Gun owners		p-value
	States with a CAP-NS law (n=1,234), weighted %(95% CI)	States without a CAP-NS law (n=1,716), weighted %(95% CI)	
Age group, years			0.03
18–29	9.7 (7.3, 12.8)	14.4 (11.9, 17.3)	
30–44	23.3 (20.4, 26.5)	23 (20.6, 25.6)	
45–59	29.9 (26.9, 33)	30 (27.5, 32.7)	
≥60	37.1 (34.2, 40.2)	32.6 (30.2, 35.1)	
Sex			0.13
Male	71.3 (68.1, 74.2)	68.2 (65.4, 70.8)	
Race/ethnicity			<0.001
Non-Hispanic White	71.9 (68.4, 75.2)	81.6 (79, 84.1)	
Non-Hispanic Black	8.7 (6.7, 11.1)	7.6 (6, 9.5)	
Non-Hispanic Other	6 (4.4, 8.2)	4.4 (3.2, 6.1)	
Hispanic	13.4 (10.9, 16.4)	6.4 (4.9, 8.3)	
Rurality			<0.001
Urban	33.7 (30.5, 37)	28.5 (26, 31.3)	
Suburban	50.2 (46.8, 53.6)	47.6 (44.7, 50.5)	
Rural	16.1 (13.8, 18.7)	23.9 (21.5, 26.4)	
Region			<0.001
Northeast	7.4 (5.9, 9.2)	14 (12.2, 16.1)	
Midwest	16.3 (14.1, 18.8)	27 (24.5, 29.5)	
South	49.2 (45.9, 52.6)	39.6 (36.8, 42.5)	
West	27.1 (24.1, 30.2)	19.4 (17.2, 21.9)	
MSA status			<0.001
Metropolitan	86.7 (84.3, 88.8)	74.2 (71.5, 76.7)	
Education			0.03
Less than high school	6.6 (4.8, 9.2)	5.8 (4.3, 7.8)	
High school	24.3 (21.3, 27.6)	31.1 (28.3, 34)	
Some college	35.2 (32.1, 38.4)	32.8 (30.2, 35.5)	
Bachelor's degree or higher	33.9 (31, 36.9)	30.3 (27.9, 32.8)	
Income, \$			<0.001
≤25,000	7.8 (6.1, 9.9)	9 (7.4, 10.9)	
25,000–59,999	20.8 (18.1, 23.9)	26.8 (24.3, 29.5)	
60,000–99,999	24 (21.4, 26.9)	27.2 (24.7, 29.8)	
≥100,000	47.4 (44.1, 50.8)	37 (34.3, 39.9)	
Children (<18 years old) at home			0.53
Yes	30.5 (27.3, 34)	31.9 (29.2, 34.8)	
Number of firearms			0.04
1	36.6 (33.3, 40)	32.3 (29.7, 35.1)	
2–3	28.9 (25.9, 32.1)	28.4 (25.8, 31.1)	
4–5	14.4 (12.1, 16.9)	13.9 (12, 16)	
>5	20.1 (17.7, 22.9)	25.4 (22.9, 28.1)	
Handgun/Long gun			0.01
Handgun only	34.6 (31.4, 37.9)	29.4 (26.8, 32.1)	
Long gun only	18.7 (16.2, 21.5)	16.7 (14.7, 19)	
Handgun and long gun	46.7 (43.4, 50.1)	53.9 (51, 56.7)	
Concealed carry permit			0.01
Yes	32.2 (29.2, 35.5)	38.3 (35.4, 41.2)	
Firearms training			0.46
Yes	62.1 (58.6, 65.3)	60.4 (57.5, 63.2)	

(continued on next page)

Table 1. Characteristics of Gun Owners by State CAP-NS Law Status (*continued*)

Characteristics	Gun owners		p-value
	States with a CAP-NS law (n=1,234), weighted %(95% CI)	States without a CAP-NS law (n=1,716), weighted %(95% CI)	
Reason for ownership			0.31
Protection	71.9 (68.8, 74.7)	73.8 (71.3, 76.2)	
Storage practices of gun owners			
Any unlocked	54.8 (51.2, 58.3)	61.2 (58.2, 64.1)	0.01
Any loaded and unloaded	28.7 (25.7, 31.9)	33.7 (30.9, 36.6)	0.02
Any loaded	47.4 (43.9, 50.9)	52.2 (49.2, 55.2)	0.04
Storage practices of gun owners with children			
Any unlocked	36.2 (29.6, 43.4)	49.2 (43.5, 54.9)	0.01
Any loaded and unloaded	18.4 (13.5, 24.6)	22.5 (18, 27.8)	0.28
Any loaded	46.9 (39.8, 54.2)	46.7 (41, 52.4)	0.96
Household firearm prevalence (2016)	25	40	
Firearm suicides/total suicides (2018)	45	54	
Believe that guns should be stored locked and unloaded with ammo stored separately			0.02
Yes	40.6 (37.3, 44)	35.3 (32.6, 38.1)	
Believe that having a gun in the home makes it a safer place			0.83
Yes	88 (85.8, 90)	88.3 (86.4, 90)	
Belief regarding whether their state has a CAP-NS law			<0.001
Believe their state has a CAP-NS law	36.6 (33.5, 40)	18.1 (15.9, 20.5)	
Believe their state does not have a CAP-NS law	15.3 (12.9, 18.1)	22.4 (20, 24.9)	
Don't know if their state has a CAP-NS law	48.1 (44.7, 51.4)	59.5 (56.6, 62.3)	
Belief regarding whether their state has a CAP-NS law (HH with children)			<0.001
Believe their state has a CAP-NS law	30.2 (24.3, 36.7)	14.7 (11.2, 19)	
Believe their state does not have a CAP-NS law	16.6 (11.8, 22.8)	28.3 (23.5, 33.7)	
Do not know whether their state has a CAP-NS law	53.2 (46.3, 60.1)	57 (51.4, 62.4)	

Note: Boldface indicates statistical significance ($p < 0.05$).

CAP-NS, Child Access Prevention Negligent Storage; HH, household; MSA, metropolitan statistical area.

[95% CI=48.4, 62.7]–57.2% [95% CI=52.7, 61.6]) and 1.4% among those who lived with children (41.3% [95% CI=28.1, 55.5]–39.9% [95% CI=31.7, 48.8]). Thus, among respondents whose beliefs indicated their storage was not directly affected by the presence of a CAP-NS law, covariate adjustment accounted for most of the variability in storage by CAP-NS status.

DISCUSSION

In this nationally representative survey, after adjusting for potential confounders of the CAP-NS law–firearm storage relationship, gun owners in states with a CAP-NS law were not more likely to lock up all their firearms than were gun owners in states without CAP-NS laws.

One reason CAP-NS laws may not have had their desired effect on storage practices is that most gun owners, including gun owners who lived with children, did not know whether they lived in a state with a CAP-NS law. But knowledge deficits are not the whole story as

most gun owners who thought they lived in a state with a CAP-NS law nevertheless stored guns unlocked (including nearly one third who lived with children).

What mortality benefit should CAP-NS laws produce, assuming the entire storage difference observed in adjusted analyses was caused by these laws? Simulation studies suggest that the youth firearm suicide rate would have decreased by at most 2.5% given the 5% relative storage difference by CAP-NS status observed in adjusted analyses.³ This benefit, which is not statistically discernable from no benefit, is materially smaller than published estimates. To the extent that the effect of CAP-NS laws on current storage practices is a good approximation of the effect CAP-NS laws had on storage closer to their enactment, findings from this study raise questions about the mortality benefits that have been attributed to CAP-NS laws in quasi-experimental studies. It is possible, however, that the effect of CAP-NS laws proximate to their passage was larger than their abiding effect on contemporary storage practices. Data to assess this possibility do not currently exist.

Table 2. Proportion of Gun Owners Who Store Any Guns Unlocked by CAP-NS Law Status and Belief

Variables	CAP-NS states (95% CI)	Non-CAP-NS states (95% CI)	Crude OR (95% CI)	AOR ^a (95% CI)	Counterfactual non -CAP-NS ^b (95% CI)
All gun owners	54.8 (51.2, 58.3)	61.2 (58.2, 64.1)	0.78 (0.64, 0.93)	1.09 (0.85, 1.39)	52.7 (46.6, 58.9)
Gun owners in households with children	36.2 (29.6, 43.4)	49.2 (43.5, 54.9)	0.59 (0.40, 0.86)	0.93 (0.57, 1.53)	38.0 (27, 49.8)
Gun owners who believe their state does not have a CAP- NS law or do not know (all gun owners)	57.2 (52.7, 61.6)	64 (60.7, 67.1)	0.75 (0.60, 0.95)	1.07 (0.79, 1.44)	55.7 (48.4, 62.7)
Gun owners who believe their state does not have a CAP- NS law or do not know (households with children)	39.9 (31.7, 48.8)	52.3 (46.1, 58.5)	0.60 (0.39, 0.94)	0.95 (0.53, 1.68)	41.3 (28.1, 55.5)
Gun owners who believe their state has a CAP-NS law (all gun owners)	50.6 (44.9, 56.3)	49.8 (42.8, 56.9)	1.03 (0.72, 1.49)	1.37 (0.86, 2.18)	42.8 (32, 54.3)
Gun owners who believe their state has a CAP-NS law (households with children)	27.9 (18.3, 40.2)	32.4 (20.3, 47.4)	0.81 (0.35, 1.88)	1.11 (0.39, 3.21)	25.8 (10.7, 49.9)

Note: To see how comparing the crude OR to the AOR in each row allows moving from observed to adjusted (counterfactual) proportions of gun owners who have unlocked firearms, consider the first row in Table 2. The crude exposure OR for having any unlocked firearms in CAP negligent storage versus non-CAP negligent storage states is 0.78 (from unadjusted logistic regression). This OR is the simple cross product of a 2 X 2 table with the proportion of households that have unlocked guns (54.8% in CAP-NS states and 61.2% in non-CAP-NS states) = $(0.548 \times [1 - 0.612]) / (0.612 \times [1 - 0.548]) = 0.78$. When adjusted for the number and types of guns, CCW permit, children in the home, and state-level firearm prevalence, the corresponding adjusted OR = 1.09. An AOR of 1.09 corresponds uniquely to a new 2 X 2 table with gun owners in CAP-NS states storing their guns exactly as observed (i.e., 54.8% of gun owners have unlocked guns, 45.2% do not) and counterfactual gun owners in non-CAP-NS states storing fewer guns unlocked in adjusted analyses than in unadjusted analyses (i.e., fewer than directly observed). Specifically: $1.09 = ([0.548 \times (0.388 + x)] / [(0.612 - x) \times 0.452])$. Hence, $x = 0.085$, and the proportion of gun owners in non-CAP negligent storage states who would be expected to store guns unlocked if they looked like gun owners in CAP-NS states is $61.2\% - 8.5\% = 52.7\%$. Analogous calculations can be made for each point estimate and the corresponding 95% CI boundaries. The difference between the observed storage in CAP-NS states and the counterfactual storage in non-CAP-NS states is a measure of how much CAP-NS laws affect storage. Symmetrical calculations (and conclusions) can be made (and drawn) for the counterfactual storage practices in CAP-NS states (i.e., the storage that CAP-NS gun owners would have if they looked like gun owners in non-CAP-NS states) and compared with the observed practices in non-CAP-NS states. For example, the percentage unlocked in adjusted CAP-NS states would increase to 63.2%, and could then be compared with the observed 61.2% in non-CAP-NS states. Additional adjustment beyond the parsimonious model did not materially affect point estimates. For example, additional adjustment for education, race, sex, age, urbanization, income, and region produced an AOR for all gun owners of 1.07 (95% CI = 0.78, 1.48), compared with the AORs in the main model above, of 1.09 (95% CI = 0.85, 1.39).

^aValues are adjusted for number of guns, types of gun, children in the home, CCW permit, firearm prevalence.

^bCounterfactual non-CAP storage is the storage in non-CAP states after adjustment for the number of guns, types of guns, CCW permit, children in the home, and state-level firearm prevalence (i.e., if gun owners in non-CAP states resembled gun owners in CAP states with respect to these covariates). CAP-NS, Child Access Prevention Negligent Storage; CCW, Permit to carry a concealed weapon.

Limitations

This study should be interpreted with additional limitations in mind. First, analyses did not assess whether survey respondents changed their storage practices before compared with after CAP-NS laws were enacted. For most respondents, this would have required asking about changes that occurred in the 1990s and asking whether storage practices changed in relation to changing residence from a state with versus without CAP-NS laws (and vice versa).

Second, estimates in this study are based on 2,950 gun owners, one third of whom live with children. After

stratifying by CAP-NS status, estimates of storage practices among households with children had wide CIs, limiting the extent to which inferences could be drawn for this important subgroup. Nevertheless, the point estimates and patterns observed in households with children mirrored those for all gun-owning households.

Third, to the extent that the characteristics adjusted for in multivariate analyses (e.g., number of guns) lie along the causal pathway, estimates in this study may be biased to the null. This, however, seems unlikely as none of these characteristics would be expected to change in

response to CAP-NS laws. Moreover, estimates produced by a direct difference-in-differences approach that does not involve covariate adjustment are nearly identical to those based on adjustment. For example, Table 2 shows that 64.0% of gun owners in non-CAP-NS states who could not have been affected by thinking that CAP-NS laws were in effect in their state have unlocked firearms, compared with 57.2% of their counterparts in CAP-NS states (a difference of 6.8%). For all gun owners (i.e., irrespective of beliefs about CAP-NS laws) this difference is 6.4% (61.2%–54.8%). Thus, the direct effect of CAP-NS laws on storage using this covariate-independent approach is <1% (6.4%–6.8%= –0.4%).

Fourth, although unadjusted storage was safer among gun owners who thought their state had a CAP-NS law, compared with gun owners who thought otherwise (approximately 50% vs 60% had unlocked guns), this should not be interpreted as evidence that knowing CAP-NS exist in one's state caused an appreciable proportion of gun owners to lock guns. This inference is not warranted because the association could also reflect, to an indeterminate extent and independent of factual knowledge about a state's CAP-NS status, a tendency among gun owners who store all guns locked-up to believe their state has a CAP-NS law. Nevertheless, as most gun owners did not know whether their state had a CAP-NS law, additional lives might well be saved if states with CAP-NS laws better publicized that fact and, in addition, devoted resources to educating the public about the empirically based rationale for locking all household firearms as a way to prevent youth suicide and unintentional firearm injury in households that contain firearms.

Finally, as with all self-reported surveys, this online panel survey is subject to inaccuracies from social desirability and recall bias, and from intentional distortions. Online panel surveys, however, have been shown to reduce social desirability bias and yield more accurate estimates of respondent characteristics compared with other forms of eliciting opinions, such as telephone surveys.^{19,20} Nevertheless, panel members who chose not to participate in the survey may have differed in ways related to the association examined here, compared with those who participated.

CONCLUSIONS

Child Access Prevention Negligent Storage laws are a prevention strategy advanced in the hope that gun owners subject to these laws would be motivated to store firearms more securely and that, as a result, fewer children would be injured or die. This study suggests that CAP-NS laws, at least as they have been enacted and enforced

to date, have had at best a very modest effect on firearm storage. If the storage effect is as small as this study indicates, the mortality benefits previously attributed to CAP-NS laws are overstated. As such, developing interventions that effectively reduce firearm mortality by reducing access to firearms remains an urgent clinical and public policy priority.

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CREDIT AUTHOR STATEMENT

Matthew Miller: Conceptualization; Formal analysis; Funding acquisition; Investigation; Methodology; Supervision; Writing - original draft. Wilson Zhang: Data curation; Formal analysis; Validation; Writing - review & editing. Ali Rowhani-Rahbar: Methodology; Writing - review & editing. Deborah Azrael: Conceptualization; Funding acquisition; Investigation; Methodology; Writing - review & editing.

SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at <https://doi.org/10.1016/j.amepre.2021.09.016>.

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