

EXHIBIT 3

Trend in Loaded Handgun Carrying Among Adult Handgun Owners in the United States, 2015–2019

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 See also Bonne, p. 1705.

Objectives. To determine the frequency of loaded handgun carrying among US adult handgun owners overall and by state concealed carry law status.

Methods. Using a nationally representative survey of US firearm-owning adults in 2019, we asked handgun owners (n = 2389) about their past-month handgun carrying behavior.

Results. A total of 30.3% (95% confidence interval [CI] = 28.0%, 32.6%) of handgun owners carried handguns monthly, of whom 38.1% (95% CI = 33.6%, 42.7%) did so daily. In permitless carry states, 29.7% (95% CI = 25.9%, 33.9%) of handgun owners carried handguns in the past month, compared with 33.1% (95% CI = 29.9%, 36.3%) in shall issue states and 19.7% (95% CI = 14.9%, 25.5%) in may issue states. Of handgun owners without a permit, 7.5% (95% CI = 4.1%, 13.3%) of those in may issue states and 11.5% (95% CI = 8.5%, 15.4%) of those in shall issues states carried handguns in the past month.

Conclusions. In 2019, about 16 million US adult handgun owners carried handguns in the past month (up from 9 million in 2015), and approximately 6 million did so daily (twice the 3 million who did so in 2015). Proportionally fewer handgun owners carried handguns in states where issuing authorities had substantial discretion in granting permits. (*Am J Public Health.* 2022;112(12):1783–1790. <https://doi.org/10.2105/AJPH.2022.307094>)

Little is known about the frequency and features of firearm carrying among adult handgun owners in the United States. In fact, over the past 30 years, only a few peer-reviewed national surveys, conducted in 1994, 1995, 1996, and 2015, have provided even the most basic information about firearm carrying frequency.^{1–4} Since the first of these surveys, reasons offered by firearm owners for why they own firearms have shifted from hunting and sports shooting toward personal protection. In 1994, for example, 46% of firearm owners reported owning firearms for protection²; by 2015, that number had reached 65%,⁵ and, by 2019, it had reached 73%.⁶ As personal

protection became the predominant motivation for owning firearms, handgun ownership increased disproportionately from 64% in 1994 to 83% in 2021.^{2,7}

These trends have been accompanied by a loosening of state laws governing who can carry handguns in public places. State laws regulating concealed handgun carrying are typically divided into the following types: (1) permitless: no permit is required; (2) shall issue: the issuing authority is required to grant a permit to anyone who meets certain minimal statutory requirements with no or limited discretion; (3) may issue: the issuing authority has substantial discretion to approve or deny a concealed carry

permit to an applicant.⁸ In 1990, only 1 state allowed permitless handgun carry; at the time of this writing, that number had risen to 21.⁸

To our knowledge, the only contemporary national estimates of handgun carrying among US adults come from the National Firearms Survey in 2015 (NFS-2015). NFS-2015 found that 23.5% of adult handgun owners (9 million adults) had carried a loaded handgun on their person in the month before the survey; of those, 34.5% (3 million) had done so every day.⁴ Of handgun owners who carried, 4 in 5 carried primarily for protection, 4 in 5 had a concealed carry permit, 2 in 3 always carried concealed, and 1 in 10 always carried openly.⁴

The prevalence of handgun carrying was similar in states with permitless carry laws and states with shall issue carry laws. By contrast, the prevalence of carrying was notably lower in states with may issue carry laws.⁴

In the current study (NFS-2019), we used nationally representative survey data collected from July 30, 2019, to August 11, 2019, to update information pertaining to the proportion of handgun owners who carried a handgun over the previous month (and, of those, the fraction who carried daily), the characteristics of those who carried, and the prevalence of handgun carrying by handgun owners in states that did versus did not require a permit for concealed carrying at the time of the survey.

METHODS

Data for this cross-sectional study came from the Web-based NFS-2019. We designed the survey to assess firearm-related beliefs and behaviors, including handgun carrying, in a nationally representative sample of US adults living in firearm-owning households. The survey was conducted by the research firm Ipsos from July 30, 2019, to August 11, 2019. Consistent with NFS-2015, respondents were drawn from Ipsos's Knowledge Panel, an online sampling frame comprising approximately 55 000 US adults selected using address-based sampling methods on an ongoing basis with an equal probability of selection.

Panel members' report of whether they live in a home with firearms is collected on enrollment in Knowledge Panel and updated approximately annually, allowing us to restrict invitations for participation to adults (other than those on active duty in the US military) who reported that they lived in a home with firearms. E-mail invitations

to participate in the survey contained a link that sent them to the survey questionnaire. No description of the survey content accompanied the invitation. Reminder e-mails were sent to nonresponders on days 3, 6, 9, and 12. Ipsos has a modest point-based incentive program through which participants accrue points to redeem for rewards. Of the 6721 panel members invited to complete the survey, 4379 started and 4030 completed the survey (response proportion: 65.2%; participation proportion: 92.0%). Participants were not involved in the design, conduct, reporting, or dissemination plans of our research. More details about the survey can be found elsewhere.⁹

Measures

Firearm ownership status was determined by responses to the question: "Do you personally own a gun?" Only respondents who responded affirmatively were then asked questions about the type of firearms owned. The current study was limited to respondents within firearm-owning households who reported that they personally owned a handgun ($n = 2389$) regardless of whether they also owned a long gun. The survey focused exclusively on loaded handgun carrying on the person, and not in a vehicle. Respondents were asked: "In the past 30 days, have you carried a loaded handgun on your person?" Those who answered affirmatively were then asked about the number of days that they had carried (range = 0–30) and the primary reason for carrying.

Additional survey domains included respondents' sociodemographic characteristics, presence of children in the home, veteran status, type of firearm owned (handguns only vs handguns

and long guns), and holding a concealed carry permit. Selected survey questions related to this analysis are provided in the Appendix (available as a supplement to the online version of this article at <https://ajph.org>). State handgun carry laws were identified using the state law database at Giffords Law Center to Prevent Gun Violence.⁸ State laws were coded by whether they required a permit for concealed handgun carrying in public in July to August 2019.

Some survey respondents refused to answer some questions about handgun ownership and handgun carrying behaviors. Of the 4030 total respondents, 1 refused to answer if they had carried a loaded handgun in the past 30 days, 3 refused to answer how many days they had carried a loaded handgun, 28 refused to answer if they had a concealed carry permit, and 15 refused to answer questions about the types of guns they owned (handguns, long guns, etc.). In addition, 81 respondents said that they did not know if they had a concealed carry permit. These refused-to-answer or "do not know" responses were recoded as missing.

A total of 20 respondents who indicated that they had carried a handgun in the past 30 days responded "0 days" when asked for the number of days in which they had carried their handgun in the past 30 days. We recoded these individuals as "did not carry in the past 30 days" in our analyses. There was no missingness in information on the reason for carrying a handgun. We generated variables about carrying laws by state; because there was no missingness in the state data for respondents, there was no missingness in carrying law variables either. There was no missingness in any demographic data from the survey respondents. Overall, because of the low

frequency of missing values in this analysis, we conducted no imputation.

Statistical Analysis

Analyses used individual-level survey weights provided by Ipsos. These weights account for survey nonresponse and under- or overcoverage imposed by the study-specific sample design. Weights also adjusted for benchmark demographic distributions from the US Census Current Population Survey or the American Community Survey and population characteristics that are not available in either of those surveys (e.g., firearm ownership) based on Knowledge Panel profile data for gender, age, race,

ethnicity, census region, metropolitan statistical area status, and education.

For this analysis, we calculated weighted percentages and their corresponding 95% confidence intervals (CIs) for each measure. Sociodemographic characteristics of handgun owners and type of firearms owned were described by past-30-day handgun carrying status (i.e., did carry vs did not carry). We conducted all analyses in Stata version 14 (StataCorp LP, College Station, TX) using the “svy” suite of commands.

RESULTS

Of all handgun owners, 30.3% (95% CI = 28.0%, 32.6%) reported having

carried a handgun in the past 30 days. Among those, 38.1% (95% CI = 33.6%, 42.7%) reported doing so every day (Figure 1). Among handgun owners who reported carrying at least once in the past 30 days, the mean number of carrying days was 18.1 (95% CI = 17.1, 19.2).

Compared with handgun owners who did not carry a handgun, a significantly greater proportion of those who carried were younger, male, lived in the South (South Atlantic, East-South Central, West-South Central), and owned both handguns and long guns (Table 1). The distributions of race, educational attainment, annual household income, urbanicity of the community of residence, presence of children in the

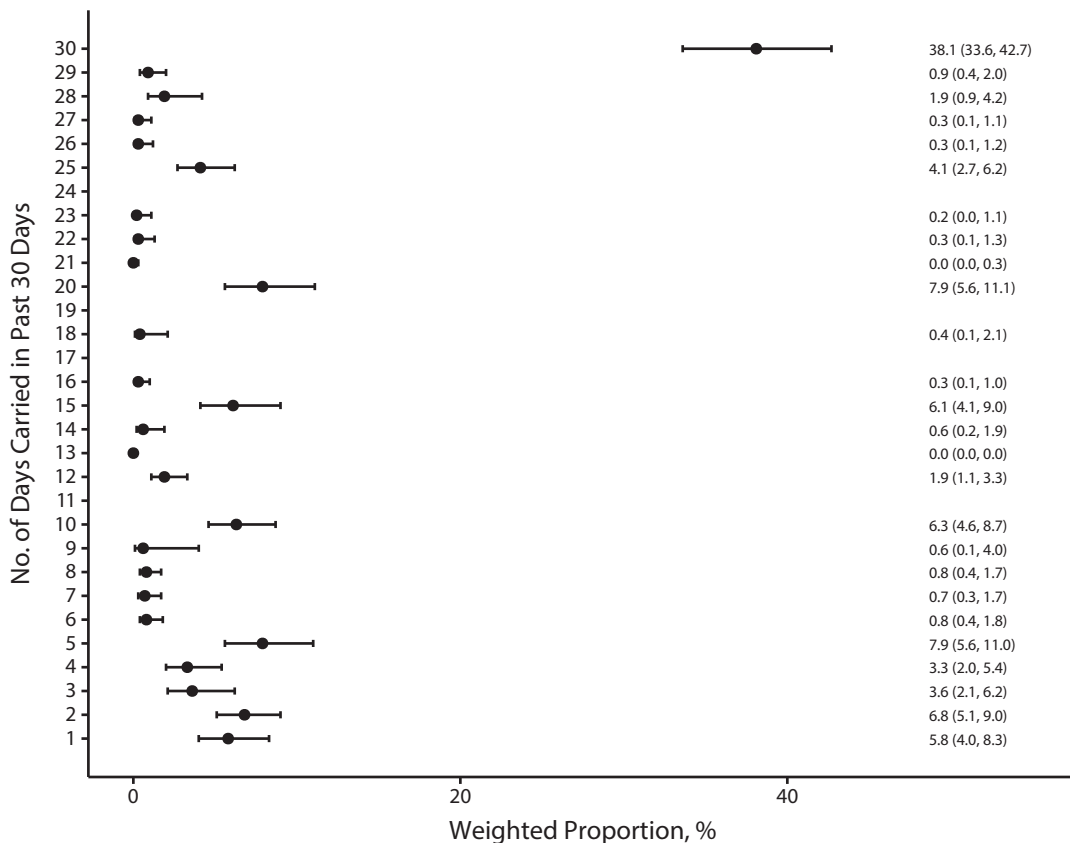


FIGURE 1— Number of Carrying Days Among Handgun Owners Who Carried a Handgun in the Past 30 Days: National Firearms Survey, United States, 2019

Note. Horizontal bars in the figure are 95% confidence intervals.

TABLE 1— Characteristics of Handgun Owners by Past-30-Day Carrying Status: National Firearms Survey, United States, 2019

Characteristics	No.	Did Not Carry (n = 1736), % (95% CI)	Carried (n = 653), % (95% CI)	Total (n = 2389), % (95% CI)	P
All respondents	2389	69.7 (67.4, 72.0)	30.3 (28.0, 32.6)	100	
Age, y					<.001
18–29	121	9.4 (7.4, 11.9)	16.9 (13.0, 21.8)	11.7 (9.7, 13.9)	
30–44	433	22.3 (19.8, 24.9)	24.4 (20.7, 28.6)	22.9 (20.8, 25.1)	
45–59	709	30.5 (28.0, 33.1)	32.8 (28.6, 37.3)	31.2 (29.0, 33.5)	
≥ 60	1126	37.8 (35.3, 40.4)	25.9 (22.5, 29.5)	34.3 (32.2, 36.4)	
Gender					<.001
Male	1651	63.4 (60.6, 66.1)	79.3 (75.4, 82.8)	68.2 (65.9, 70.4)	
Female	738	36.6 (33.9, 39.4)	20.7 (17.2, 24.6)	31.8 (29.6, 34.1)	
Race/ethnicity					.31
Non-Hispanic White	1968	77.6 (74.8, 80.1)	72.8 (68.0, 77.1)	76.1 (73.7, 78.4)	
Non-Hispanic Black	159	8.6 (6.9, 10.6)	10.6 (7.8, 14.2)	9.1 (7.7, 10.9)	
Non-Hispanic other	39	3.0 (2.0, 4.5)	4.6 (2.6, 8.0)	3.5 (2.5, 4.9)	
Hispanic	148	9.1 (7.3, 11.2)	10.5 (7.6, 14.4)	9.6 (8.0, 11.4)	
Non-Hispanic ≥ 2 races	75	1.8 (1.2, 2.5)	1.5 (0.9, 2.5)	1.7 (1.3, 2.3)	
Education					.61
Less than high school	69	6.0 (4.4, 8.0)	5.3 (3.2, 8.6)	5.7 (4.4, 7.4)	
High school	480	28.4 (25.8, 31.3)	29.2 (24.8, 34.0)	28.7 (26.4, 31.1)	
Some college	826	32.5 (29.9, 35.2)	35.5 (31.3, 39.9)	33.5 (31.2, 35.7)	
Bachelor's degree or higher	1014	33.1 (30.6, 35.6)	30.1 (26.3, 34.1)	32.1 (30.1, 34.3)	
Annual household income, \$.6
< 25 000	183	7.6 (6.3, 9.3)	8.3 (6.0, 11.5)	7.9 (6.6, 9.3)	
25 000–74 999	826	32.8 (30.2, 33.5)	35.6 (31.2, 40.3)	33.7 (31.5, 36.0)	
75 000–124 999	752	30.0 (27.5, 32.6)	29.4 (25.5, 33.7)	29.8 (27.6, 32.0)	
≥ 125 000	628	29.5 (27.0, 32.2)	26.7 (22.7, 31.0)	28.7 (26.5, 31.0)	
Community of residence					.11
Metro area	1929	81.5 (79.1, 83.6)	77.9 (73.7, 81.5)	80.4 (78.4, 82.3)	
Non-metro area	460	18.5 (16.4, 20.9)	22.1 (18.5, 26.3)	19.6 (17.7, 21.6)	
Region based on residence ^a					.024
New England	62	2.2 (1.6, 3.1)	3.8 (2.2, 6.3)	2.7 (2.0, 3.6)	
Mid-Atlantic	194	7.9 (6.5, 9.5)	7.1 (5.2, 9.5)	7.6 (6.5, 8.9)	
East-North Central	344	13.3 (11.6, 15.3)	11.8 (9.2, 15.0)	12.9 (11.4, 14.5)	
West-North Central	210	8.1 (6.8, 9.7)	6.5 (4.6, 9.1)	7.7 (6.6, 9.0)	
South Atlantic	491	19.8 (17.6, 22.1)	25.0 (21.3, 29.1)	21.4 (19.5, 23.4)	
East-South Central	190	8.0 (6.6, 9.7)	9.8 (7.3, 13.1)	8.5 (7.2, 10.0)	
West-South Central	330	15.9 (13.7, 18.2)	16.4 (12.9, 20.6)	16.0 (14.1, 18.0)	
Mountain	266	11.3 (9.6, 13.3)	11.3 (8.6, 14.7)	11.3 (9.8, 13.0)	
Pacific	302	13.5 (11.7, 15.5)	8.4 (6.4, 11.0)	12.0 (10.6, 13.6)	
Children (< 18 y) in household					.16
None	1828	69.6 (66.7, 72.3)	65.8 (61.1, 70.2)	68.5 (66.0, 70.8)	
≥ 1	561	30.4 (27.7, 33.3)	34.2 (29.8, 38.9)	31.5 (29.2, 34.0)	
Veteran					.3
Yes	573	19.7 (17.7, 21.9)	21.9 (18.4, 25.7)	20.4 (18.6, 22.3)	
No	1816	80.3 (78.1, 82.3)	78.1 (74.3, 81.6)	79.6 (77.7, 81.4)	

Continued

TABLE 1— Continued

Characteristics	No.	Did Not Carry (n = 1736), % (95% CI)	Carried (n = 653), % (95% CI)	Total (n = 2389), % (95% CI)	P
Firearm type owned					<.001
Handgun only	900	44.3 (41.5, 47.2)	24.8 (20.9, 29.0)	38.3 (36.0, 40.7)	
Handgun and long gun	1489	55.7 (52.8, 58.5)	75.2 (71.0, 79.1)	61.7 (59.3, 64.0)	

Note. CI = confidence interval. Column percentages are weighted sample proportions.

^aNew England comprises CT, ME, MA, NH, RI, and VT. Mid-Atlantic comprises NJ, NY, and PA. East-North Central comprises IL, IN, MI, OH, and WI. West-North Central comprises IA, KS, MN, MO, NE, ND, and SD. South Atlantic comprises DE, FL, GA, MD, NC, SC, VA, and WV. East-South Central comprises AL, KY, MS, and TN. West-South Central comprises AR, LA, OK, and TX. Mountain comprises AZ, CO, ID, MT, NV, NM, UT, and WY. Pacific comprises AK, CA, HI, OR, and WA. *P* values are calculated based on a design-based F-test that takes the sampling design into account.

household, and veteran status were not notably different between handgun owners who carried and those who did not (Table 1). Prevalence estimates of handgun carrying by specific handgun owner characteristics are available in Figure A (available as a supplement to the online version of this article at <https://ajph.org>). Most handgun owners who carried a handgun did so primarily for personal protection against people (71.8%; 95% CI = 67.4%, 75.8%; Figure 2). Findings on the frequency of and reasons for carrying stratified by gender are found in Figures B through E (available as supplements to the online version of this article at <https://ajph.org>).

A smaller proportion of handgun owners residing in may issue states (19.7%; 95% CI = 14.9%, 25.5%) carried a handgun than did those in permitless carry (29.7%; 95% CI = 25.9%, 33.9%) and shall issue (33.1%; 95% CI = 29.9%, 36.3%) states (Figure 3). Approximately 11.0% (95% CI = 8.7%, 13.8%) of handgun owners who lived in a state that required a permit to carry but did not themselves have a permit reported that they had carried a handgun in the past month. Specifically, of handgun owners who resided in a may issue state but did not have a permit, 7.5% (95% CI = 4.1%, 13.3%) carried a

handgun; of handgun owners who resided in a shall issue state but did not have a permit, 11.5% (95% CI = 8.5%, 15.4%) carried a handgun (Figure F, available as a supplement to the online version of this article at <https://ajph.org>).

DISCUSSION

In this nationally representative study conducted in 2019 (NFS-2019), we found that about 3 in 10 handgun owners carried a loaded handgun on their person in the past 30 days; among those, about 4 in 10 did so every day. Extrapolating to the estimated 53 million US adults who owned handguns in 2019, we estimate that about 16 million US adults carried a handgun in the past 30 days (up from 9 million in 2015), and that almost 6 million did so every day (twice the approximately 3 million who did so in 2015).^{4,7}

In NFS-2019, about 7 in 10 handgun owners who carried handguns cited protection against people as the main reason for carrying. This proportion was greater (about 8 in 10) in NFS-2015. This difference could indicate an actual decline in the proportion of handgun owners who carried for personal protection against people from 2015 to 2019 or, alternatively, could be attributable to differences in the wording of the

questions asked in 2015 and 2019. In 2015, the options included “For protection against strangers” and “For protection against people I know” while in 2019 the option was “For personal protection against people” (other options in both surveys included for protection against animals, hunting, sporting, and other reasons). Regardless, results from the current survey continue to demonstrate that a large majority of handgun owners who carry do so for self-defense.

We found no notable differences between the proportion of handgun owners residing in permitless carry states who carried handguns versus those residing in shall issue states who did so. Consistent with findings from NFS-2015, however, we found that proportionally fewer handgun owners residing in may issue states than those residing in permitless carry states and shall issue states carried handguns in 2019. In 2015, we found that 21.1% and 9.1% of handgun owners residing in permitless states and may issue states at that time had carried handguns, respectively. In 2019, those numbers were 33.1% and 19.7%, respectively.

In addition, in 2015, only 1.2% of handgun owners without a permit residing in may issue states had carried handguns; that number rose to 7.5%

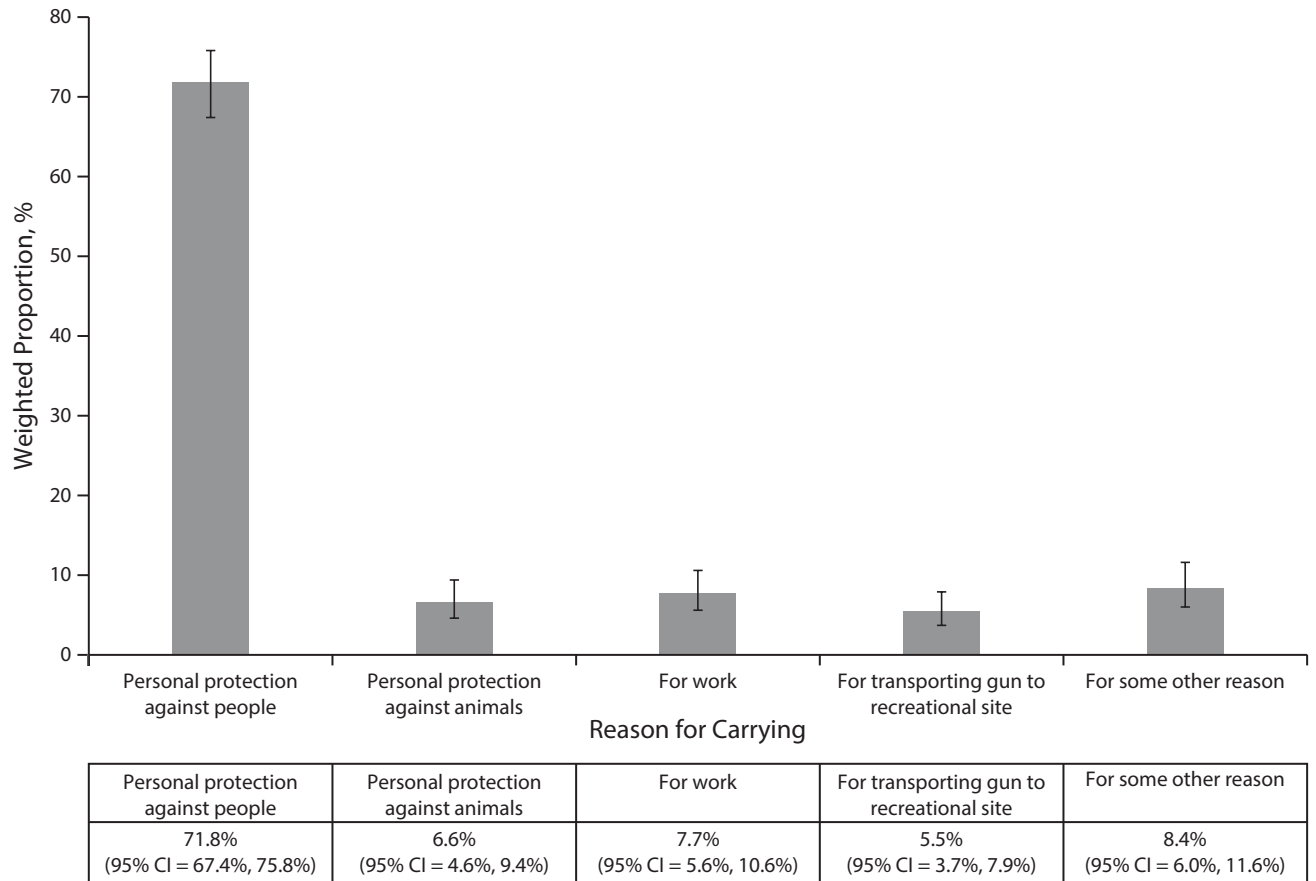


FIGURE 2— Primary Reason for Handgun Carrying Among Handgun Owners Who Carried a Handgun in the Past 30 Days: National Firearms Survey, United States, 2019

Note. Vertical bars in the figure are 95% confidence intervals (CIs).

in 2019. The NFS-2015 question specifically asked about concealed carrying whereas the NFS-2019 question asked about carrying. Nonetheless, if in 2019, as in 2015, only 10% of handgun owners always carried handguns openly (and thus would not necessarily be in violation of a permit law),⁴ our findings still suggest a substantial increase in the number of handgun owners who carried handguns without a permit when they were legally required to have one.

Limitations

Our study was subject to limitations. First, we did not ask survey respondents in which state they had carried

their handgun; they may have carried their handgun in a state different from the one in which they resided at the time of the survey resulting in some degree of misclassification in our findings pertaining to the prevalence of handgun carrying in relation to state laws.

Second, NFS-2019 did not ask respondents whether they carried a handgun concealed or openly. However, it is likely a safe assumption that the overwhelming majority of those who carried handguns did so concealed, at least on some days. In NFS-2015, for example, only about 10% of handgun owners who carried said they always carried openly. If that same fraction pertained in 2019, it would revise our estimate of the number

of past-month carriers to 14.6 million, which still represents a substantial increase from 2015.⁴

Third, as in all self-report surveys, recall and reporting bias may have affected our results. To minimize recall error, questions on handgun carrying referred to the 30-day period before the survey, reducing concerns about recall bias. Although reporting bias (e.g., social desirability bias) may still have affected our results, online panel surveys such as ours tend to be less biased than alternatives, such as telephone surveys, in this specific aspect.¹⁰

Fourth, panel members who chose not to participate in our survey may have been different from those who

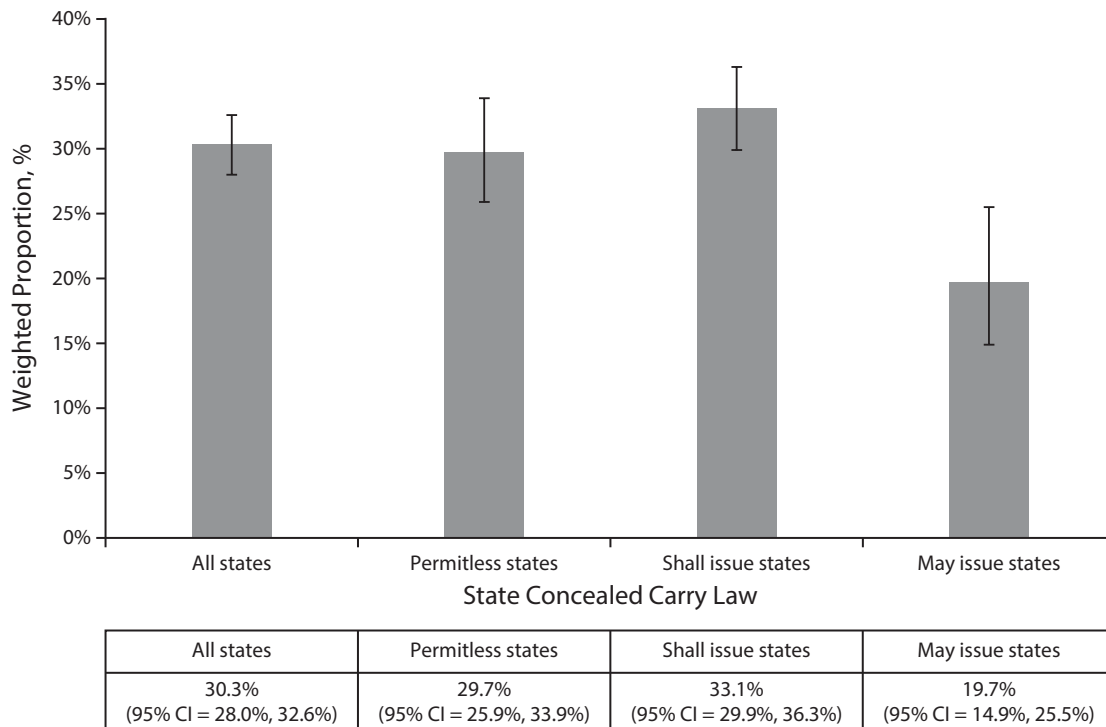


FIGURE 3— Prevalence of Past-30-Day Handgun Carrying Among Handgun Owners by State Concealed Carry Laws: National Firearms Survey, United States, 2019

Note. Vertical bars in the figure are 95% confidence intervals (CIs).

chose to participate regarding their frequency and features of handgun carrying. However, an advantage of online panels is high completion proportions for individuals who begin the survey.¹¹ In our study, the completion proportion was 92.0%; only 15 respondents refused to answer handgun ownership questions, and only 4 respondents refused to answer handgun carrying behavior questions. Our survey response proportion of 65.2% is also substantially greater than the range of percentages observed in typical nonprobability, opt-in, online surveys (2%–16%).¹¹

Public Health Implications

On November 3, 2021, the US Supreme Court heard its first case explicitly related to handgun carrying (*New York State Rifle & Pistol Association v. Bruen*).¹²

The case tested whether the New York law requiring lawful firearm owners to provide a proper cause to obtain a permit to carry is too restrictive. On June 23, 2022, the Supreme Court ruled that New York's proper-cause requirement violates the Fourteenth Amendment's guarantee of equal protection under the law by preventing law-abiding citizens with ordinary self-defense needs from exercising their Second Amendment right to keep and bear arms in public for self-defense.¹³ This ruling could further catalyze the loosening of firearm-carrying regulations in different parts of the country at a time when, as our study indicates, trends in handgun carrying already point to more US adults carrying loaded handguns in public places, including without a permit when a permit is required. The effect of this loosening on firearm

ownership and carrying as well as public safety and public health should be an important subject of research in the future. *AJPH*

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CONTRIBUTORS

A. Rowhani-Rahbar, D. Azrael, and M. Miller contributed to the conceptualization and design of the study. All authors contributed to the acquisition, analysis, or interpretation of data. A. Rowhani-Rahbar drafted the article. All authors contributed to the critical revision of the article for important intellectual content. A. Gallagher conducted the statistical analyses. D. Azrael and M. Miller obtained funding. A. Rowhani-Rahbar, D. Azrael, and M. Miller provided administrative, technical, and material support, and supervision.

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CONFLICTS OF INTEREST

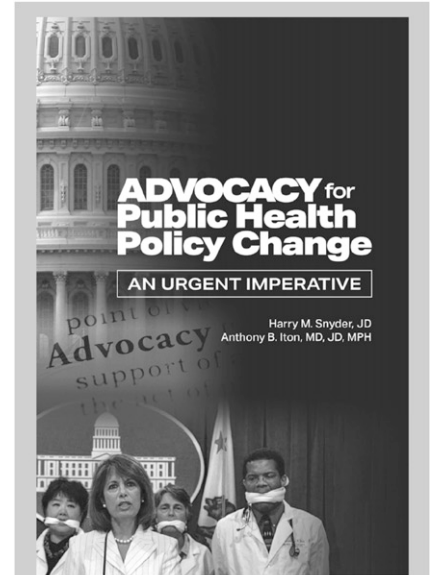
The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

This study was approved by the institutional review board at the Harvard T. H. Chan School of Public Health.

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Advocacy for Public Health Policy Change: An Urgent Imperative

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