

# Firearm Storage Practices and Children in the Home, United States, 1994

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**Objectives:** To estimate the national prevalence of firearm ownership and storage practices in the home, to compare storage practices in homes with and without children, and to analyze demographic characteristics related to firearm storage practices in homes with children.

**Design:** A 1994 random-digit dialing telephone survey. We weighted the data to provide national estimates.

**Participants:** English- and Spanish-speaking adults in households in 50 states and Washington, DC.

**Main Outcome Measures:** Ownership of working powder firearm(s) in home and/or vehicle and firearm storage practices in the home.

**Results:** Of 5238 households surveyed, one third kept at least 1 firearm in the home and/or vehicle. Of 1598 households with firearm(s) in the home and known firearm storage practices, 21.5% kept at least 1 gun loaded

and unlocked in the home, 30.0% stored all firearms unloaded and locked, and 48.5% stored firearms in a manner classified between these 2 practices. Households with children were more likely than households without children to store all firearms unloaded and locked (41.5% vs 20.9%); households without children were more likely than households with children to store at least 1 firearm loaded and unlocked (29.8% vs 11.1%). Among households with children and firearms, there were regional differences with respect to storage practices.

**Conclusions:** These prevalence data show that children are potentially exposed to firearms in many households. This health threat illustrates the need for education about the issue of pediatric firearm injuries and for interventions to minimize associated risks. Health care providers should take advantage of opportunities to counsel patients regarding firearm safety in the home.

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**Editor's Note:** Every time I read about firearms in homes, I think about the words of a song I heard as a child. They went something like this: "I didn't know the gun was loaded, and I'm so sorry my friend; I didn't know the gun was loaded, and I'll never, ever do it again." Amen.

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**F**IREARM-RELATED injuries exact a significant toll on individuals, families, and communities in the United States. In 1995, firearm-related deaths totaled 35 957; children and teens (aged 0-19 years) accounted for 5285 (14.7%) of these deaths (3280 homicides and legal interventions, 1450 suicides, 440 unintentional deaths, and 115 deaths of undetermined intentionality) (unpublished data, Centers for Disease Control and Prevention, Atlanta, Ga, June 1997). In 1993, nonfatal firearm-related injuries numbered approximately 100 000.<sup>1</sup>

A review of the leading causes of death by age group highlights the impact of these injuries on young lives. Firearm-related injuries were the second-leading cause of death for persons aged 10 to 14 years and 15 to 25 years, the sixth-leading cause for children aged 5 to 9 years, and the eighth-leading cause for children as young as 1 to 4 years. In 1995, youths aged 15 to 19 years had the highest rate of unintentional firearm-related death (1.4/100 000) of all age groups and the second-highest rate of firearm-related homicide (15.4/100 000) of all age groups. The highest rate of firearm-related homicide was among persons aged 20 to 24 years (unpublished data, Centers for Disease Control and Prevention, June 1997).

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## MATERIALS AND METHODS

The Injury Control and Risk Survey was administered by telephone to English- and Spanish-speaking adults (age  $\geq 18$  years) in households selected by random-digit dialing. The survey used a stratified random sample from a proprietary database of residential telephone numbers within all 50 states and Washington, DC. Telephone exchanges with more than 10% of households occupied by minorities were over-sampled to increase minority representation. Calls were made from April through September 1994, with a minimum of 6 attempts to reach each household. To ensure an equal sex balance, once a household was reached, the number of adult male and female residents in each household was determined. Using a random selection procedure, we chose a sex category from those applicable to the adult residents in the household. If more than 1 eligible individual in the selected sex category was present in the household, interviewers asked for the occupant with the most recent birthday. If the eligible individual was not present at the time of the initial telephone contact, callbacks and/or appointments were made to reach that person. Once the eligible resident was contacted, informed consent was obtained, and the interview was conducted.

Data were weighted to provide nationally representative estimates consistent with the March 1994 Current Population Survey (unpublished data, US Bureau of the Census, 1994). Given the complex survey design, SUDAAN software (SAS Inc, Cary, NC) was used to calculate weighted estimates and percentages, as well as 95% confidence intervals.<sup>16</sup> Final weights reflected each respondent's probability of selection, as well as independently estimated population sizes (age  $\times$  sex  $\times$  race  $\times$  household type). All percentages, SEs, and national household estimates reported are weighted, except where noted. The Pearson  $\chi^2$  statistic was used to test the statistical significance of association among variables.

In 12 modules, the Injury Control and Risk Survey encompassed various injury risk factors as well as personal and household demographic data. One of the modules was dedicated to the subject of firearms and included questions

about ownership and storage. Respondents were asked about working powder firearms of any type in the home or vehicle. They were instructed to exclude from their answers any BB and pellet guns, tear gas guns, and firearms that cannot fire, such as antique or display guns. Respondents were asked a sequence of questions, beginning with "Are there any loaded or unloaded firearms in your home or the car, van, or truck you usually drive? This includes firearms stored in the basement, garage, or any attached buildings." If the response was "no," "don't know," or "refused," no more questions were asked and those respondents were excluded from further analysis. Other questions included: (1) "Are there any loaded firearms in your home? Do not include firearms in a car, truck, or other vehicle." (2) "Are all of the loaded firearms in your home stored in a locked place that can only be opened with a key or combination, or with a trigger lock that can only be opened with a key or combination? A safety is not a trigger lock." (3) "Is the ammunition for any of those unloaded and unlocked firearms stored in the same room as the firearms? Closets in a room are considered part of the room." (4) "Is the ammunition stored in a locked or unlocked place?"

Firearm storage practices were defined according to known loaded status of the firearm(s), known locked status of firearm(s) and ammunition, and storage of the ammunition. These practices were categorized into 3 groups. The 2 extremes were "unloaded and locked," which refers to all firearms in the house being unloaded and locked, and "loaded and unlocked," which refers to at least 1 firearm in the house in the household being loaded and unlocked. If responses led to either of these classifications, no questions regarding ammunition were asked. "Immediate storage" includes all firearm(s) and ammunition storage practices that fall between these 2 categories.

The household formed the unit of analysis. "Households with children" were defined as those with children younger than 18 years. "Don't know" and "refused" responses to questions about household demographic characteristics were excluded from the demographic and storage practice analyses, as were any responses coded as missing. Households with firearms in the vehicle only were also excluded from these analyses.

Various studies have estimated that firearms are kept in 35% to 50% of households in this country.<sup>2-5</sup> National surveys found that more than one third of firearm owners kept these weapons loaded either some or all of the time, approximately one half did not keep their firearms locked, and 20% of firearm-owning households had a loaded, unlocked firearm in the home.<sup>5,6</sup>

A literature review of the epidemiology of childhood firearm-related injuries shows that a child's access to a firearm, which is often stored in the home and frequently is a handgun, is a contributing factor in these injuries.<sup>7-11</sup> Children, who are naturally inquisitive, and adolescents, who are daring and susceptible to peer pressure, may seek out a firearm in their home or may not heed warnings to avoid handling a firearm in any setting when unsupervised by an adult. Most adolescents have the strength to pull the trigger of a firearm, particularly a handgun, but the ability of very young children to fire a handgun should not be underestimated. A recent study showed

that 25% of children aged 3 to 4 years, 70% of those aged 5 to 6 years, and 90% of those aged 7 to 8 years tested had a 2-finger trigger-pull strength of at least 10 pounds. This enables them to potentially fire 40 (63%) of 64 commercially available handguns that require a trigger-pull strength of less than 5 pounds and an additional 19 (30%) that require a trigger-pull strength of 5 to 10 pounds.<sup>12</sup>

Multifaceted approaches to decreasing firearm-related injuries, particularly among children, have been proposed and implemented. These include strategies aimed at educational, legislative, and environmental factors.<sup>13-15</sup> Health care providers can play a role in these efforts by educating themselves about firearm-related injuries and counseling patients about the risks of firearm-related injuries, especially to children in the home, and about ways to minimize those risks.

To assess the household environment in which children may be exposed to firearms and related injury, we estimated the national prevalence of firearm ownership

**Table 1. Firearm Storage Practices of Households With and Without Children (Aged <18 Years), United States, 1994**

Firearm Storage Practice*	Households	
	With Children (n = 703)	Without Children (n = 895)
All firearms unloaded and locked		
No. in survey	266	182
Weighted % (95% CI)	41.5 (37.3-45.7)	20.9 (17.9-23.9)
Estimated No. of US households† (in millions)	5.8	3.7
Intermediate‡		
No. in survey	341	426
Weighted % (95% CI)	47.4 (43.2-51.6)	49.3 (45.7-53.0)
Estimated No. of US households† (in millions)	6.6	8.6
At least 1 firearm loaded and unlocked		
No. in survey	96	287
Weighted % (95% CI)	11.1 (8.7-13.6)	29.8 (26.5-33.1)
Estimated No. of US households† (in millions)	1.6	5.2

\*CI indicates confidence interval.

†The total of the 6 US household estimates provided exceeds the total US household estimate cited in the text because of rounding.

‡Firearm storage practices between the other categories.

and storage in the home, compared storage practices in homes with and without children, and analyzed the demographic characteristics related to storage practices in homes with children and firearms.

## RESULTS

Nine thousand three hundred forty-two people were contacted; 3630 refused to participate, 474 interviews were incomplete, and 5238 interviews were completed (unweighted response rate, 56.1%).<sup>17</sup> Of 5238 respondent households, 3457 households (63.9%; SE, 0.8%) reported keeping no firearm in the home or vehicle, 1635 (33.2%; SE, 0.8%) reported keeping a firearm in the home and some also kept 1 or more firearms in a vehicle, 43 (0.8%; SE, 0.1%) reported keeping a firearm in a vehicle only, 93 (1.9%; SE, 0.2%) refused to answer, and 10 (0.2%; SE, 0.1%) did not know (percentages given in the "Results" section are weighted unless otherwise indicated). The last 3 response categories were excluded from the analysis involving specific storage practices in the home.

Of the 1635 households reporting a firearm in the home, 1598 (95.3%) had categorizable storage practices. Among these 1598 surveyed households, representing 31.4 million households nationwide, 30.0% (SE, 1.3%; 448 households) reported storing firearms unloaded and locked, while 48.5% (SE, 1.4%; 767 households) reported intermediate storage practices. Based on the 21.5% (SE, 1.1%; 383 households) who reported storing at least 1 loaded, unlocked firearm in the home, it is estimated that this practice is followed in 6.8 million households in the United States.

Storage practices differed significantly between the estimated 14.0 million households with children (44.5%,

703 surveyed households) and the 17.5 million households without children (55.5%, 895 surveyed households). While the intermediate storage practice category represented the plurality for both groups of households, the significant differences between them were in the extreme storage categories (**Table 1**). Households without children were more likely than households with children to store at least 1 firearm loaded and unlocked (29.8% vs 11.1%). Conversely, households with children were more likely than households without children to store all firearms unloaded and locked (41.5% vs 20.9%). Among households with children, nationally, even though 5.8 million households stored all firearms unloaded and locked, another 1.6 million households stored at least 1 firearm loaded and unlocked.

Several household demographic characteristics were analyzed with respect to firearm storage practices among households with firearms and children (**Table 2**). The data suggest there was a general association between census region and firearm storage practices. Despite the general association, direct comparisons among the categories of this characteristic were inappropriate because of the excessively large coefficients of variation for selected census region estimates.

To address the instability of these census region estimates, the South was compared with the rest of the country. Southern households were more likely (17.6%; 95% confidence interval, 13.2%-22.0%) to store at least 1 firearm loaded and unlocked compared with households in the rest of the country (7.0%; 95% confidence interval, 4.2%-9.8%). No statistically significant regional differences were found for the other firearm storage practice categories. Also, no associations were found between any of the other demographic characteristics and firearm storage practices.

## COMMENT

The national prevalence of firearm ownership in approximately 33% of homes that we found in this survey is comparable with results of other studies.<sup>2,4,5</sup> The issue of storage practices in these homes warrants discussion because accessibly stored firearms provide children with the opportunity for inappropriate and unauthorized use of a firearm. The presence of at least 1 loaded, unlocked firearm in nearly 22% of homes with firearms, regardless of child residency status, illustrates the potential for access to an immediately usable firearm and a resultant injury. Similar prevalence rates were found in other national random telephone surveys.<sup>5,18</sup>

While there are limited data on the sociodemographic characteristics of households with varying firearm storage practices, our finding that households with children were less likely than those without children to store at least 1 firearm loaded and unlocked is consistent with results of other national and state studies.<sup>5,18-20</sup> These data suggest that many adults are willing to take precautions to protect children from obtaining a firearm in the home. While it is encouraging to note in this study that more than 40% of households with children and firearms store all firearms unloaded and locked, it is disturbing that in more than 11% of households with

**Table 2. Demographic Characteristics of 703 Households With Children (Age <18 Years) and Firearms, by Firearm Storage Practices, United States, 1994\***

Demographic Characteristic	Weighted % (95% CI)		
	All Firearms Unloaded and Locked (n = 266)	Intermediate Storage† (n = 341)	At Least 1 Firearm Loaded and Unlocked (n = 96)
US Census region‡			
Northeast	50.0 (37.4-62.6)	40.3 (27.9-52.6)	9.7 (2.1-17.3)§
Midwest	49.8 (40.9-58.8)	46.5 (37.5-55.4)	3.7 (0.7-6.6)§
West	37.1 (28.4-45.7)	54.1 (45.1-63.0)	8.8 (3.9-13.7)
South	35.8 (29.8-41.7)	46.7 (40.7-52.7)	17.6 (13.2-22.0)
Total annual income, \$			
≥35 000	38.6 (33.1-44.1)	49.9 (44.3-55.4)	11.6 (8.4-14.8)
<35 000	42.8 (35.8-49.7)	46.4 (39.5-53.3)	10.8 (6.6-15.1)
Highest education			
≤High school graduate	48.6 (40.9-56.3)	40.0 (32.6-47.4)	11.5 (6.7-16.2)
Some college	41.3 (34.2-48.3)	49.5 (42.4-56.7)	9.8 (5.6-12.7)
≥College graduate	35.2 (28.3-42.0)	51.9 (44.8-58.9)	13.0 (8.4-17.5)
Type of dwelling			
Mobile home/apartment	46.7 (37.0-56.4)	38.1 (28.6-47.6)	15.2 (8.5-21.8)
House	40.2 (35.6-44.8)	49.5 (44.9-54.1)	10.3 (7.6-12.8)
Home ownership			
Rent	39.3 (29.6-48.9)	45.9 (29.6-48.9)	14.8 (8.2-21.3)
Own	42.0 (37.4-46.6)	47.5 (42.9-52.1)	10.4 (7.7-13.1)
County size			
Urban	41.2 (36.4-46.0)	46.2 (41.3-58.5)	12.6 (9.5-15.6)
Rural	42.1 (33.9-50.2)	50.3 (42.1-58.5)	7.6 (3.3-11.8)

\*Percentages across rows may not add to 100% because of rounding. CI indicates confidence interval.

†Firearm storage practices between the other categories.

‡P<.001.

§Coefficient of variation greater than 30%.

||County size is defined as urban if the metropolitan statistical area contains more than 20 000 households and as rural if the area contains fewer households.

children and firearms, at least 1 firearm is loaded and unlocked. Studies of families visiting pediatric practices have found comparable results. In a survey involving urban, suburban, and rural practices, investigators found that a mean of 13% of families owning firearms reported keeping them loaded and unlocked.<sup>2</sup> In other surveys, 10% of families reported that their firearms were loaded, unlocked, and within the reach of children, and 14% of firearm owners with children younger than age 18 years in the household kept firearms loaded and unlocked.<sup>9,18</sup>

Our statistically significant finding that households with children and firearms located in the South were more likely to store a firearm loaded and unlocked than similar households elsewhere in the country provides some evidence of differential regional effects on firearm storage practices. Surveys of gun owners have also found that living in the South was associated with keeping a loaded firearm in the home.<sup>6,18</sup>

Some limitations of this study need to be addressed. Although the response rate of 56.1% was lower than expected, the demographics of these households were similar to those reported by the US Bureau of the Census and the Department of Labor and by the Department of Health and Human Services.<sup>21</sup> In some instances, the respondent may not have been the firearm owner and therefore may have been less knowledgeable than the firearm owner about the firearm storage practices used in the household. Issues such as behavioral and environmental factors that can influence a person's decision to own a firearm or to store it in the home were

not explored. Such factors include reasons for firearm ownership, a history of victimization, and the perception of safety in the neighborhood or home. Moreover, this study's lack of power because of small sample sizes for specific categories of demographic characteristics and firearm storage practices could have masked true differences. In addition, if respondents were reluctant to answer questions or felt compelled to give socially desirable answers, bias may have been introduced (eg, firearm-owning respondents with children in the home may have reported firearm storage practices they consider to be less accessible than those actually practiced, leading to underestimation of the most accessible storage practices). Despite these limitations, the findings of this study provide needed information regarding the important issue of firearms in the home as a threat to the safety of children.

Health care providers have an opportunity to include advice about reducing the risk of firearm-related injury when counseling patients about preventive health measures. The prevalence of loaded, unlocked firearms in homes is sufficient to warrant health care providers taking a universal precautions approach to firearm safety counseling. Providers should assume that in their own practice and community, children, teens, and adults may be exposed to and use firearms in the home. With information about the epidemiology of firearm-related injuries and types of firearm storage practices, particularly with respect to children, health care workers have the potential to positively influence a patient's decision to



optimize safety in the home. Clinic-based studies have shown that most patients are receptive to firearm-related injury counseling from their health care provider.<sup>22,23</sup> Steps to change the environment in which a household firearm-related injury can occur certainly include choosing not to store a firearm in the home. Another measure to reduce the accessibility of firearms by children and unauthorized persons is to store firearms unloaded and locked with the ammunition kept in a separate place. The concept of decreased child accessibility to firearms, especially when unsupervised, is endorsed by public health practitioners, clinicians, and firearm sporting organizations.<sup>13,24,25</sup> Evidence also suggests that most firearm safety training may not substantially reduce the number of inappropriately stored firearms.<sup>5,6,18,26</sup> This information reinforces the need for multiple approaches to decrease firearm-related injuries, emphasizing the need for health care providers to take advantage of every opportunity to include firearm safety counseling in preventive medicine messages.

Providers should learn of the national trends of firearm-related injuries but should also be aware of local patterns. To better educate providers, public health agencies can include information on why and how to promote firearm safety behaviors at health care conferences and employee orientation courses. Similar information should be included in training curricula and in publications for medical, nursing, health education, and health communication audiences.

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