

## VALIDATING SURVEY RESPONSES TO QUESTIONS ABOUT GUN OWNERSHIP AMONG OWNERS OF REGISTERED HANDGUNS

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While survey-based data on firearm ownership are essential for epidemiologic studies of the relation between gun ownership and injuries, the validity of respondent answers to questions about gun ownership has not been confirmed. In order to assess the accuracy of interview data about firearms, in June to August 1987, the authors attempted to contact residents of 75 homes in the cities of Memphis, Tennessee and Seattle, Washington listed as the address of the owner of a recently registered handgun. Despite problems with inaccurate registration data, contact was ultimately made with 55 households, 35 of which consented to a general interview that included a series of questions about gun ownership. Respondents in 31 of these 35 households (88.6%) readily acknowledged that one or more guns were kept in their home. Respondents in three of the remaining four households (8.6%) stated that guns were recently kept in their homes but were no longer kept there. Only one respondent (2.9%) denied categorically that guns of any kind were kept in her home. The authors conclude that, at least among registered gun owners, respondent answers to questions about gun ownership are generally valid and that survey data of this type can be utilized with confidence.

epidemiologic methods; firearms; interviews; survey methods

Firearms are second only to motor vehicles as a mechanism of fatal injury in the United States (1). In 1986 alone, 17,363 suicides, 11,836 homicides, and 1,649 un-

intentional deaths involved firearms (2). While the annual toll of serious but non-fatal firearm injuries in the United States is unknown, it is estimated that 198,000 Americans sustain gunshot wounds each year (3).

Approximately 120 million guns are privately owned in the United States. About half of all homes in the nation contain one or more firearms (4). These figures have largely been derived from firearms production statistics and importation data as well as survey-based measures of the extent of private weapons ownership (4-9). While survey-based data have been used extensively in epidemiologic investigations of the association between rates of firearm availability and crime, injuries, and violent

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death (9-11), the validity of such data are unknown. Given the importance accorded national statistics on gun ownership, the potential consequences of misclassifying owners of firearms could be great. To test the validity of respondent answers to questions about gun ownership, we conducted a pilot survey of newly registered gun owners in two cities, Memphis, Tennessee and Seattle, Washington.

#### MATERIALS AND METHODS

In the states of Washington and Tennessee, only handguns must be registered. Through the Freedom of Information Act, we obtained from the Memphis Police Department and the Department of Licensing of the State of Washington, access to the original forms completed by persons who registered handguns in Memphis and Seattle between 30 and 90 days prior to our review. A total of 75 names were randomly selected for study. Persons who listed their occupation as law enforcement or security officer were excluded.

Each address was then approached indirectly by randomly selecting a nearby residence and conducting a neighborhood census in a circular fashion until the household of interest was reached. If an adult respondent (age 18 years or older) was found at home, he or she was asked to provide written informed consent to a brief interview. Complete confidentiality was assured and respondents were aware of their right to terminate the interview at any time. A \$10 incentive fee was also offered to encourage participation.

If no one was home at the time a household was first contacted, a census letter and self-addressed return envelope were left. Two additional attempts to contact each household were made later at different times of the day and on different days of the week. Efforts were terminated if no contact was made after three attempts, if it was learned that the registered gun owner had moved, or if the respondent lived in a building or complex to which access was blocked for security reasons.

Each interview consisted of a brief series of general questions about household composition, socioeconomic status, and a variety of home safety and security measures. Respondents were unaware of our prior knowledge of gun ownership at the time these interviews were conducted. If the respondents affirmed that a gun of any kind was presently kept in their home, they were asked to identify what type(s) of gun(s) are kept, how long guns had been kept and the family's single most important reason for keeping one or more guns in the home. If the respondent denied that guns were kept in the home, he or she was asked if guns had ever been kept there and, if so, how recently they had been removed. All interviews were conducted in a uniform manner by project staff.

#### RESULTS

In Memphis, 25 addresses were randomly selected for study. A total of 415 households were approached during general neighborhood census activity, and demographic data were obtained from 320 households (77 percent). Contact was eventually made with 23 of 25 target households (92 percent). Of these 23 households, respondents in 20 households (87 percent) agreed to be interviewed. No one was found at home on three separate visits to two households and residents of two contacted households refused to be interviewed. At one home, the person listed as the owner of the registered firearm was found to be blind, almost deaf, and severely intoxicated with alcohol. He could not be interviewed.

In Seattle, attempts were made to contact 50 households listed as the address of a registered handgun owner. A total of 188 households were approached during general census activity and 155 households (82 percent) provided demographic information. Contact was eventually made with residents in 30 of the 50 target households (60 percent). Of these 30 households, respondents in 15 households (50 percent) agreed to be interviewed. No one was found at home on three separate visits to six house-

holds. In six additional cases, the address listed on the registration certificate led to an empty lot or warehouse. In five cases, no one with the name listed on the registration certificate lived at that address. Access was blocked to secured buildings or apartment complexes in the three remaining households. Of the 30 Seattle households contacted for an interview, three occupants were not interviewed because the occupants stated that the owner of the registered firearm had recently moved out. Eleven refused to be interviewed; one could not speak English (table 1).

The mean age of respondents in both study sites was 42.6 years (range, 22-62 years). Sixty percent were male. No other demographic data were available from registration certificates in Seattle. The age and sex distributions of respondents in each community were not statistically significantly different from those of nonrespondents (table 2).

When asked "...are guns of any kind kept in your home?", 31 of 35 respondents in the two study communities (88.6 percent) answered "yes" (table 3). Three of the four who replied "no" stated that guns had recently been kept in their homes but were no longer there. Only one respondent living in the home of a registered gun owner (2.9 percent) denied that guns had ever been kept in her home.

Thirty of the 31 residents who acknowledged current gun ownership (97 percent) stated that one or more of their firearms

TABLE 1  
*Reasons for nonresponse to survey on gun ownership in Memphis, Tennessee and Seattle, Washington, June-August, 1987*

Causes for nonresponse:	No.	%
Refused consent for interview	13	32.5
No one at home ( $\times 3$ visits)	8	20.0
False address on registration form	6	15.0
Registrant not living at listed address	5	12.5
Access to dwelling restricted	3	7.5
Moved prior to interview	3	7.5
Unable to give informed consent	2	5.0
Total	40	100

TABLE 2

*Characteristics of nonrespondents versus respondents to survey on gun ownership in Memphis, Tennessee and Seattle, Washington, June-August, 1987*

	Respondents (n = 35)	Nonrespondents (n = 40)
<b>Memphis</b>		
No.	20	5
Mean age (years)*	45.4	66.3
% Male	40.0	60.0
<b>Seattle</b>		
No.	15	35
Mean age (years)*	38.9	42.8
% Male	86.7	94.3

\* Missing data on a nonrespondent.

TABLE 3

*Responses to survey on gun ownership in Memphis, Tennessee and Seattle, Washington, June-August, 1987 (n = 35 respondents)*

	No.	%
Yes to present gun ownership	31	88.6
Yes to past gun ownership	3	8.6
Denied gun ownership	1	2.9
<b>Most important reason for gun ownership</b>		
Self defense	19	55.9
Hunting	7	20.6
Target shooting	4	11.8
Work	1	2.9

was a handgun. The remaining individual refused to answer this or any subsequent question about firearms. Nineteen of the 34 respondents who acknowledged current or recent gun ownership (56 percent) identified "self defense" as the single most important reason that guns were or had been kept in their home. Seven respondents (21 percent) identified hunting and four respondents (12 percent) identified target shooting. One respondent stated that her husband, a police officer, was required to carry a firearm at work. This occupation had not been listed on his registration form.

## DISCUSSION

Survey-based estimates of firearm ownership are used extensively in epidemiologic

studies of suicide, homicide, and gunshot deaths from a variety of causes (4, 8–11). Interview questions about gun ownership and weapons handling have also been used to assess risk factors for unintentional injury in children (12). Despite the extent to which researchers rely on survey data, several investigators have expressed doubts about the validity of this information. For example, significant discrepancies exist between firearm production figures and survey-based estimates of gun ownership (4). Newton and Zimring (13) argue that survey data probably underestimate rates of gun ownership because some respondents may be unaware of weapons owned by other members of their household or be reluctant to admit that guns are kept in their home. Kleck (14) has echoed this sentiment.

In a comprehensive review of firearms, crime, and violence in America, Wright et al. (4) rejected these concerns. They noted that in a 1978 survey conducted by Decision Making Information, Inc. (7), only one percent of respondents refused to answer questions about gun ownership. In contrast, up to 20 percent of national survey respondents refuse to answer questions about household income (4). Furthermore, most national surveys have reached generally consistent findings—roughly half of all homes contain one or more firearms. Given these findings, Wright et al. concluded that concern about the supposed reluctance of gun owners to admit possession of weapons amounts to little more than “. . . an inappropriate projection of the standards and values of the people who *write* about weapons onto the people who *own* them” (emphasis added) (4, p. 79). No one, however, has previously attempted to resolve this question by directly assessing the validity of respondent answers to questions about gun ownership.

Given the potentially sensitive nature of our study, we carefully obtained written, informed consent prior to each interview. Respondents were given assurances of confidentiality. Although firearm registration data are accessible through the Freedom of

Information Act, all case identifiers were purged following completion of the survey.

We found that respondent answers to questions about gun ownership were generally valid. Even after exclusion of persons who might be expected to own a gun for occupational reasons, respondents in 31 of 35 households identified as the home address of a registered gun owner readily acknowledged that one or more guns were kept in their home. Three of the remaining four households stated that guns had recently been kept in their homes. This suggests that truthful answers were probably obtained in at least 34 of 35 cases (97 percent).

In both study communities, only handgun purchasers are required to register their new firearm. It is therefore noteworthy that virtually all of our respondents identified one or more of their firearms as a handgun. This observation provides further evidence that their answers are reliable. A majority also stated that they keep firearms primarily for self defense—a finding consistent with the results of prior surveys of handgun owners (4).

Several limitations to our study warrant comment. First, out of 75 selected households, we were able to obtain interviews from only 35 (47 percent). While no contact could be established for a variety of reasons in 27 cases, thirteen of 48 contacted households (27 percent) refused to be interviewed. This high rate of refusal was probably due to our requirement for written, informed consent prior to each interview. While nonrespondents did not differ significantly from respondents in terms of age or sex, the possibility that they might have been less truthful if interviewed cannot be excluded.

Second, our study sample is small and includes respondents from only two cities. While a wide variety of individuals of different races and backgrounds were interviewed, they may not be representative of the general gun-owning population at large. Owners of firearms in other cities, small towns or rural areas may not respond in a

similar manner if placed in a comparable situation.

Third, when inquiring about gun ownership, our study personnel asked the following: "About half of all homes in America contain one or more guns. Are guns of any kind kept in your home?" Taken literally, this question could be interpreted to exclude firearms kept in automobiles, detached workshops, garages, firing ranges, or other locations. Individuals who answered "no" to this question may simply keep a firearm in one of these locations or be unaware of a gun owned by another member of their household.

Fourth, our study sample was limited to households listed as the home address of the owner of a newly registered handgun. Owners of firearms that were acquired long ago may be less likely to recall them when asked. Owners of unregistered firearms or illegal weapons may be less likely to consent to an interview or may answer questions about gun ownership less truthfully. Short of a forced search of each respondent's home, there is no practical way to resolve these issues.

Although we expected to have difficulty obtaining informed consent, we did not expect to encounter problems with the validity of the original registration forms themselves. In Seattle, follow-up of listed home addresses led to warehouses or empty lots in six cases. In five cases, residents answering the door denied knowing anyone by the name of the registrant. In Memphis, one form led to an elderly man who was blind and functionally deaf, suggesting his name and address may have been used by someone else. While some type of identification at the time of handgun purchase is mandatory in both cities, our findings suggest that some buyers may provide false or misleading information. Apparently the validity of these data is rarely confirmed.

Our study is, to our knowledge, the first

to demonstrate in an empirical manner that owners of registered firearms provide generally valid answers to questions about gun ownership. We cannot exclude the possibility that households containing unregistered or illegal firearms may answer less truthfully. The extent of this potential effect cannot be readily determined. Survey-based data about gun ownership are essential in order to investigate the relation between firearm availability and rates of injury, crime, and death (2). We believe, based on our validation sample, that data of this type can be utilized with confidence.

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