Home Safety Project, 1987–1992: [Shelby County, Tennessee, King County, Washington, Cuyahoga County, Ohio]

Arthur L. Kellerman, Frederick P. Rivara, Norman B. Rushforth, and Bela B. Hackman

ICPSR 6898
HOME SAFETY PROJECT, 1987-1992: [SHELBY COUNTY, TENNESSEE, KING COUNTY, WASHINGTON, CUYAHOGA COUNTY, OHIO]

(ICPSR 6898)

Principal Investigators

Arthur L. Kellerman, Frederick P. Rivara,
Norman B. Rushforth, and Bela B. Hackman
University of Tennessee, Memphis

Second ICPSR Version
November 1997

Inter-university Consortium for Political and Social Research
P.O. Box 1248
Ann Arbor, Michigan 48106
BIBLIOGRAPHIC CITATION

Publications based on ICPSR data collections should acknowledge those sources by means of bibliographic citations. To ensure that such source attributions are captured for social science bibliographic utilities, citations must appear in footnotes or in the reference section of publications. The bibliographic citation for this data collection is:


REQUEST FOR INFORMATION ON USE OF ICPSR RESOURCES

To provide funding agencies with essential information about use of archival resources and to facilitate the exchange of information about ICPSR participants' research activities, users of ICPSR data are requested to send to ICPSR bibliographic citations for each completed manuscript or thesis abstract. Please indicate in a cover letter which data were used.

DATA DISCLAIMER

The original collector of the data, ICPSR, and the relevant funding agency bear no responsibility for uses of this collection or for interpretations or inferences based upon such uses.
DATA COLLECTION DESCRIPTION

Arthur L. Kellerman, Frederick P. Rivara, Norman B. Rushforth, and Bela B. Hackman

HOME SAFETY PROJECT, 1987-1992: [SHELBY COUNTY, TENNESSEE, KING COUNTY, WASHINGTON, CUYAHOGA COUNTY, OHIO] (ICPSR 6898)

SUMMARY: The Home Safety Project was a population-based case control study of homicide in the home with control households matched to cases by victim age range, race, gender, and neighborhood (a proxy for socioeconomic status). The study was conducted in the following locations: Shelby County, Tennessee (August 23, 1987-August 23, 1992), King County, Washington (August 23, 1987-August 23, 1992), and Cuyahoga County, Ohio (January 1, 1990-August 23, 1992). The purpose of the data collection was to study risk and protective factors for homicide in the home and to identify individual and household factors associated with homicide (both behavioral and environmental). Respondents were asked a series of questions related to alcohol consumption, such as whether drinking ever created problems between household members, whether any household members had had trouble at work because of drinking, whether any physical fights or other violence had occurred in the home or outside the home due to drinking, and whether any injuries or hospital stays had resulted from drinking/fighting episodes. Additional queries covered whether any adult in the household had ever been arrested for any reason, whether anyone in the household used illicit drugs, and, if so, which ones. Questions on home safety features included whether the home had a burglar alarm, bars on the windows, exterior door deadbolt, security door, dogs, and any restricted access to the residence. Items on gun ownership covered whether there were any guns in the home and, if so, what type. Information also was elicited on the homicide that had taken place in the home, including whether the suspect was intimate with the victim, whether there was evidence of forced entry or entry without consent, whether the victim attempted to resist, and the respondent's assumption of the method of death as well as the medical examiner's determination. Demographic information includes victims' age, sex, and race, and respondents' age and sex. The unit of analysis is individual cases of homicide.

UNIVERSE: All homicides in homes that involved residents of the three study counties (Shelby County, Tennessee, King County, Washington, and Cuyahoga County, Ohio) during the study interval. Any death that was ruled a homicide was included, regardless of method. Assaults were included if the victim died within three months due to injury.
NOTE: (1) All individual identifiers were removed by the principal investigators to protect confidentiality. (2) The codebook is provided as a Portable Document Format (PDF) file. The PDF file format was developed by Adobe Systems Incorporated and can be accessed using PDF reader software, such as the Adobe Acrobat Reader. Information on how to obtain a copy of the Acrobat Reader is provided through the ICPSR Website on the Internet.

EXTENT OF COLLECTION: 2 data files + machine-readable documentation (PDF) + SAS data definition statements + SPSS data definition statements

EXTENT OF PROCESSING: SCAN/ REFORM.DOC/ UNDOCCHK.ICPSR/ DDEF.ICPSR

DATA FORMAT: Logical Record Length with SAS and SPSS data definition statements

<table>
<thead>
<tr>
<th>Part 1: Homicide Data</th>
<th>Part 2: Reduced Homicide Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>File Structure: rectangular</td>
<td>File Structure: rectangular</td>
</tr>
<tr>
<td>Cases: 776</td>
<td>Cases: 420</td>
</tr>
<tr>
<td>Variables: 39</td>
<td>Variables: 15</td>
</tr>
<tr>
<td>Record Length: 42</td>
<td>Record Length: 24</td>
</tr>
<tr>
<td>Records Per Case: 1</td>
<td>Records Per Case: 1</td>
</tr>
</tbody>
</table>

RELATED PUBLICATION:
CODEBOOK FOR HOMICIDE DATA

(PART 1)
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length, Type</th>
</tr>
</thead>
</table>
| [Case identification -- first digit is location] | N1 | 1= Memphis, TN  
2= Seattle, WA  
3= Cleveland, OH | 1,4 numeric |
| [Group] | N2 | 0= control  
1= case | 2,1 numeric |
| Home rented?  (Original question: Do you rent or own your own residence?) | SCCC5 | 1=yes  
2=no | 3,1 numeric |

Publication: **Gun Ownership as a risk factor for homicide in the home (Table 3)**  
*New England Journal of Medicine, 329: 1084-1091 (October 7) 1993*

Authors: Kellermann AL, Rivara FP, Rushforth NB, Banton JG, Reay DT, Francisco JT, Locci AB, Prodzinski J, Hackman BB, Sones G.

Sponsor: Centers for Disease Control and Prevention (CCR 402424 and CCR 403519)

Dates: August 23, 1987 to August 23, 1992 (King County, Shelby County) and January 1, 1990 to August 23, 1992 (Cuyahoga County).

N of cases: 388 matched pairs, case/control (776 cases)

# of variables: 39

Data are not weighted

Data are not compressed
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length</th>
<th>Format</th>
</tr>
</thead>
</table>

Emory Center for Injury Control
1518 Clifton Road NE
Atlanta, GA 30322
(404) 727-9977
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length ,Type</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case or control lives alone?</td>
<td>SCCC9</td>
<td>1=yes</td>
<td>4,1</td>
<td>numeric</td>
</tr>
<tr>
<td>(Original question:</td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many people live in this home, including you?)</td>
<td></td>
<td>99=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Many people drink alcoholic beverages. Does anyone in this household</td>
<td>SCCC14</td>
<td>1=yes</td>
<td>5,1</td>
<td>numeric</td>
</tr>
<tr>
<td>drink alcoholic beverages?</td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8=don’t know</td>
<td></td>
<td>9=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case or control drank alcohol?</td>
<td>SCCC15</td>
<td>1=yes</td>
<td>6,1</td>
<td>numeric</td>
</tr>
<tr>
<td>(Original question:</td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[If yes to SC/CC14]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which ones?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has drinking ever created problems between members of this household?</td>
<td>SCCC16</td>
<td>1=yes</td>
<td>7,1</td>
<td>numeric</td>
</tr>
<tr>
<td>(Don’t ask if only one person in household)</td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8=don’t know</td>
<td></td>
<td>9=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has anyone in this household every been in trouble at work because of</td>
<td>SCCC17</td>
<td>1=yes</td>
<td>8,1</td>
<td>numeric</td>
</tr>
<tr>
<td>drinking?</td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8=don’t know</td>
<td></td>
<td>9=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td>Format</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>--------</td>
</tr>
</tbody>
</table>

Emory Center for Injury Control
1518 Clifton Road NE
Atlanta, GA 30322
(404) 727-9977
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length ,Type</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case or control trouble at work because of drinking?</td>
<td>SCCC18</td>
<td>1=yes 2=no</td>
<td>9,1</td>
<td>numeric</td>
</tr>
<tr>
<td>(Original question: If yes to SC/CC17)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which ones? (Don’t ask if only one person in household - code “1”)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has anyone ever been in the hospital because of drinking?</td>
<td>SCCC19</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>10,1</td>
<td>numeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case or control hospitalized because of drinking?</td>
<td>SCCC20</td>
<td>1=yes 2=no</td>
<td>11,1</td>
<td>numeric</td>
</tr>
<tr>
<td>(Original question: If yes to SC/CC19)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which ones? (Don’t ask if only one person in household - code “1”)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Many people occasionally have quarrels or fights.</td>
<td>SCCC21</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>12,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Has anyone in this household ever been in a physical fight in the home while drinking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td>Format</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>--------</td>
</tr>
</tbody>
</table>

filename: homicb
10:18 AM, 11/14/97 -- DFW
Emory Center for Injury Control
1518 Clifton Road NE
Atlanta, GA 30322
(404) 727-9977
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Many people occasionally have quarrels or fights...)</td>
<td>SCCC22</td>
<td>1=yes</td>
<td>13,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Has anyone in this household ever been hit or hurt in a fight in the home?</td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8=don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has anyone in this household ever needed medical attention because of a fight in the home?</td>
<td>SCCC23</td>
<td>1=yes</td>
<td>14,1</td>
<td>numeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8=don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has any adult (18 or older) in this household ever been in a physical fight outside of this home?</td>
<td>SCCC24</td>
<td>1=yes</td>
<td>15,1</td>
<td>numeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8=don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Many people have problems with the law at some point in their lives. Has any adult in this household ever been arrested?</td>
<td>SCCC25</td>
<td>1=yes</td>
<td>16,1</td>
<td>numeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8=don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9=refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------</td>
<td>------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case or control ever arrested?</td>
<td>SCCC26</td>
<td>1=yes 2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Original question:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[If yes to SC/CC25]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which ones? (Don’t ask if only one person in household - code “1”)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position, Length ,Type</td>
<td></td>
<td>Format numeric</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17,1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td>Format</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>-------------------------</td>
<td>------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>It seems like an increasing number of people are using drugs such as marijuana, cocaine, heroin, barbiturates, or amphetamines. Do any members of this household use drugs?</td>
<td>SCCC65</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>18,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Case or control used illicit drugs? (Original question: [If yes to SC/CC65] Which ones? (Don’t ask if only one person in household - code ‘1’)</td>
<td>SCCC66</td>
<td>1=yes 2=no</td>
<td>19,1</td>
<td>numeric</td>
</tr>
<tr>
<td>There are a number of things some people have in their homes to possibly increase home safety. Does your home contain any of the following... A burglar alarm?</td>
<td>SCCC28</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>20,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length</td>
<td>Type</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------</td>
<td>------------------------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Burglar bars on the windows?</td>
<td>SCCC30</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>21,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length</td>
<td>Format</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------</td>
<td>-------------------------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Deadbolt locks on the outside door(s)?</td>
<td>SCCC32</td>
<td>1=yes 2=no 8=don't know 9=refused</td>
<td>22,1</td>
<td>numeric</td>
</tr>
<tr>
<td>One or more dog(s)?</td>
<td>SCCC36</td>
<td>1=yes 2=no 8=don't know 9=refused</td>
<td>23,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Security door(s)?</td>
<td>SCCC42</td>
<td>1=yes 2=no 8=don't know 9=refused</td>
<td>24,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Security access to the residence? (examples: guard at gate, buzzer to apartment from locked outside door, etc.)</td>
<td>SCCC47</td>
<td>1=yes 2=no 8=don't know 9=refused</td>
<td>25,1</td>
<td>numeric</td>
</tr>
<tr>
<td>About half of all homes in America contain one or more guns. Are guns of any kind kept in your home?</td>
<td>SCCC49</td>
<td>1=yes 2=no 8=don't know 9=refused</td>
<td>26,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length</td>
<td>Format</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>------------------------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>What type of gun(s) are/were kept in the home? (check below, all that apply)</td>
<td>SCCC54</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>27,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Handgun/pistol/revolver?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shotgun?</td>
<td>SCCC55</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>28,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Rifle?</td>
<td>SCCC56</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>29,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Are/were any of the guns kept unlocked?</td>
<td>SCCC58</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>30,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Are/were any of the guns kept loaded?</td>
<td>SCCC59</td>
<td>1=yes 2=no 8=don’t know 9=refused</td>
<td>31,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>Was gun kept primarily for protection/self-defense?</td>
<td>SCCC60</td>
<td>1=yes 2=no</td>
<td>32,1 numeric</td>
<td></td>
</tr>
<tr>
<td>[From original question: There are many reasons why people own guns.</td>
<td></td>
<td>From original coding: 1=collecting ----- &gt; recode as “no” 2=hunting ----- &gt; recode as “no” 3=target shooting ----&gt; recode as “no” 4=protection/selfdefense ----&gt; recode as “yes” 5=other -----&gt; recode as “no” 8=don’t know ------ &gt; recode as “no” 9=refused -------&gt; recode as “no”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is/was the single most important reason gun(s) are/were kept in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>your home? (If multiple reasons, indicate first response)]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>SCF2</td>
<td>1=male 2=female 8=unknown</td>
<td>33,1 numeric</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td>Format</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| Race/Ethnic           | SCF8          | 1=white
2=black
3=other

From original coding:
1=white
2=black
3=southeast asian -------> recode as “other”
4=filipino -------> recode as “other”
5=hispanic -------> recode as “other”
6=pacific islander -------> recode as “other”
7=chinese -------> recode as “other”
8=japanese -------> recode as “other”
9=american indian/eskimo -------> recode as “other”
10=other (specify) -------> recode as “other” | 34,1 | numeric |
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length, Type</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>How old are you?</td>
<td>SCF6</td>
<td>[age in years] 1=15-40 2=greater than/equal to 41</td>
<td>35,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Was suspect intimate with victim? [From original question: Relationship of the suspect to the victim:]</td>
<td>SC25</td>
<td>1=yes 2=no From original coding: 1=spouse --&gt; recode to “yes” 2=sibling --&gt; recode to “yes” 3=parent --&gt; recode to “yes” 4=child --&gt; recode to “yes” 5=other relative --&gt; recode to “yes” 6=in-law --&gt; recode to “yes” 7=friend/acquaintance --&gt; recode to “no” 8=stranger --&gt; recode to “no” 9=police --&gt; recode to “no” 10=lover --&gt; recode to “yes” 11=roommate (non-sexual relationship) --&gt; recode to “yes” 12=unknown --&gt; recode to “no” 13=other (specify) --&gt; recode to “no”</td>
<td>36,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td>Format</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Is there evidence of forced entry and/or entry without the victim’s consent?</td>
<td>SC6</td>
<td>1=yes</td>
<td>37,1</td>
<td>numeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>From original coding:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2=no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3=NA (homicide outside the victim’s residence)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4=other (define)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8=unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td>Format</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Did the victim attempt to resist the suspect/assailant?</td>
<td>SC7</td>
<td>1=yes 2=no 8=unknown</td>
<td>38,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Method of death (official medical examiner determination)</td>
<td>SCF10</td>
<td>1=firearm 2=other</td>
<td>39,1</td>
<td>numeric</td>
</tr>
</tbody>
</table>

From original coding:
1=gunshot ----> recode to “firearm”
2=hanging ----> recode to “other”
3=drugs ----> recode to “other”
4=carbon monoxide ----> recode to “other”
5=blank ----> recode to “other”
6=drowning ----> recode to “other”
7=blank ----> recode to “other”
8=uncertain at present ----> recode to “other”
9=poisoning ----> recode to “other”
10=stabbing ----> recode to “other”
11=other (define) ----> recode to “other”
12=blunt impact ----> recode to “other”
13=strangulation ----> recode to “other”
CODEBOOK FOR REDUCED HOMICIDE DATA

(PART 2)
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td></td>
<td></td>
<td>1,3</td>
<td>numeric</td>
</tr>
<tr>
<td>YEAR</td>
<td></td>
<td></td>
<td>2,2</td>
<td>numeric</td>
</tr>
<tr>
<td>TYPE</td>
<td>1= Homicide</td>
<td></td>
<td>3,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Location</td>
<td>LOC</td>
<td>1= Memphis, TN</td>
<td></td>
<td>numeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Seattle, WA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= Cleveland, OH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incident and circumstances</td>
<td>SC1</td>
<td>1= Felony-related homicide</td>
<td>5,2</td>
<td>numeric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2= Quarrel/altercation/assault</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3= Drug related (sales/distribution/money)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4= Sexual/romantic triangle</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5= No apparent motive other than homicide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6= Other (define)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12= Homicide followed by suicide</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Publication:**  
**Gun Ownership as a risk factor for homicide in the home (Table 1)**  
*New England Journal of Medicine, 329: 1084-1091 (October 7) 1993*  
Authors: Kellermann AL, Rivara FP, Rushforth NB, Banton JG, Reay DT, Francisco JT, Locci AB, Prodzinski J, Hackman BB, Somes G.  
Sponsor: Centers for Disease Control and Prevention (CCR 402424 and CCR 403519)  
Dates: August 23, 1987 to August 23, 1992 (King County, Shelby County) and January 1, 1990 to August 23, 1992 (Cuyahoga County).  
N of cases: 420  
# of variables: 15  
Data are not weighted  
Data are not compressed
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length, Type</th>
</tr>
</thead>
</table>
| Incident location                                                      | SC2           | 1= Inside the victim’s home or residence
2= Outside the victim’s home but within immediate property line
3= Inside an adjacent accessory building (eg., garage, workshop)
4= Place of work/business inside the home or residence
5= Other (define)                                                       | numeric       |
| Presumptive method of homicide (not official medical examiner’s office determination) | SC4           | 1= Gunshot
2= Hanging
3= Drugs
4= Carbon monoxide
5= Drowning
6= Uncertain at present (unknown)
7= Poisoning
8= Stabbing
9= Other (define)
10= Blunt impact
11= Strangulation                                                        | numeric       |
| If the homicide involved a firearm, what type of firearm was involved? | SC5           | 1= Handgun/pistol/revolver
2= Rifle
3= Shotgun
4= Unknown at present
5= N/A (not a shooting)                                                  | numeric       |
| Is there evidence of forced entry and/or entry without the victim’s consent? | SC6           | 1= yes
2= no
3= N/A (homicide outside victim’s residence)
4= Other (define)
8= Unknown                                                               | numeric       |
<table>
<thead>
<tr>
<th>Question</th>
<th>Variable Name</th>
<th>Variable Labels/Coding</th>
<th>Position, Length, Type</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the victim attempt to resist the suspect/assailant?</td>
<td>SC7</td>
<td>1= yes, 2= no, 8= unknown</td>
<td>10,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Relationship of the suspect to the victim</td>
<td>SC25</td>
<td>1= spouse, 2= sibling, 3= parent, 4= child, 5= other relative, 6= inlaw, 7= friend/acquaintance, 8= stranger, 9= police, 10= lover, 11= roommate (non-sexual relationship), 12= unknown, 13= other (specify)</td>
<td>11,2</td>
<td>numeric</td>
</tr>
<tr>
<td>Victim/age</td>
<td>SCF6</td>
<td>[age in years], 000= less than 1 year, 888= unknown</td>
<td>12,3</td>
<td>numeric</td>
</tr>
<tr>
<td>Sex</td>
<td>SCF7</td>
<td>1= male, 2= female, 8= unknown</td>
<td>13,1</td>
<td>numeric</td>
</tr>
<tr>
<td>Question</td>
<td>Variable Name</td>
<td>Variable Labels/Coding</td>
<td>Position, Length, Type</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>Race/Ethnic</td>
<td>SCF8</td>
<td>1= white&lt;br&gt;2= black&lt;br&gt;3= southeast asian&lt;br&gt;4= filipino&lt;br&gt;5= hispanic&lt;br&gt;6= pacific islander&lt;br&gt;7= chinese&lt;br&gt;8= japanese&lt;br&gt;9= american indian/eskimo&lt;br&gt;10= other (specify)</td>
<td>numeric</td>
<td></td>
</tr>
<tr>
<td>Method of death (official medical examiner determination)</td>
<td>SCF10</td>
<td>1= gunshot&lt;br&gt;2= hanging&lt;br&gt;3= drugs&lt;br&gt;4= carbon monoxide&lt;br&gt;5= blank&lt;br&gt;6= drowning&lt;br&gt;7= blank&lt;br&gt;8= uncertain at present&lt;br&gt;9= poisoning&lt;br&gt;10= stabbing&lt;br&gt;11= other (define)&lt;br&gt;12= blunt impact&lt;br&gt;13= strangulation</td>
<td>numeric</td>
<td></td>
</tr>
</tbody>
</table>
PUBLICATION:

GUN OWNERSHIP AS A RISK FACTOR FOR HOMICIDE IN THE HOME
GUN OWNERSHIP AS A RISK FACTOR FOR HOMICIDE IN THE HOME


Abstract Background. It is unknown whether keeping a firearm in the home confers protection against crime or, instead, increases the risk of violent crime in the home. To study risk factors for homicide in the home, we identified homicides occurring in the homes of victims in three metropolitan counties.

Methods. After each homicide, we obtained data from the police or medical examiner and interviewed a proxy for the victim. The proxies' answers were compared with those of control subjects who were matched to the victims according to neighborhood, sex, race, and age range. Crude and adjusted odds ratios were calculated with matched-pairs methods.

Results. During the study period, 1860 homicides occurred in the three counties, 444 of them (23.9 percent) in the home of the victim. After excluding 24 cases for various reasons, we interviewed proxy respondents for 93 percent of the victims. Controls were identified for 99 percent of these, yielding 388 matched pairs. As compared with the controls, the victims more often lived alone or rented their residence. Also, case households more commonly contained an illicit-drug user; a person with prior arrests, or someone who had been hit or hurt in a fight in the home. After controlling for these characteristics, we found that keeping a gun in the home was strongly and independently associated with an increased risk of homicide (adjusted odds ratio, 2.7; 95 percent confidence interval, 1.6 to 4.4). Virtually all of this risk involved homicide by a family member or intimate acquaintance.

Conclusions. The use of illicit drugs and a history of physical fights in the home are important risk factors for homicide in the home. Rather than confer protection, guns kept in the home are associated with an increase in the risk of homicide by a family member or intimate acquaintance. (N Engl J Med 1993;329:1084-1091.)

HOMICIDE claims the lives of approximately 24,000 Americans each year, making it the 11th leading cause of death among all age groups, the 2nd leading cause of death among all people 15 to 24 years old, and the leading cause of death among male African Americans 15 to 34 years old. Homicide rates declined in the United States during the early 1980s but rebounded thereafter. One category of homicide that is particularly threatening to our sense of safety is homicide in the home.

Unfortunately, the influence of individual and household characteristics on the risk of homicide in the home is poorly understood. Illicit-drug use, alcoholism, and domestic violence are widely believed to increase the risk of homicide, but the relative importance of these factors is unknown. Frequently cited options to improve home security include the installation of electronic security systems, burglar bars, and reinforced security doors. The effectiveness of these protective measures is unclear, however.

Many people also keep firearms (particularly handguns) in the home for personal protection. One recent survey determined that handgun owners are twice as likely as owners of long guns to report "protection from crime" as their single most important reason for keeping a gun in the home. It is possible, however, that the risks of keeping a firearm in the home may outweigh the potential benefits.

To clarify these issues, we conducted a population-based case-control study to determine the strength of the association between a variety of potential risk factors and the incidence of homicide in the home.

Identification of Cases

Shelby County, Tennessee; King County, Washington; and Cuyahoga County, Ohio, are the most populous counties in their respective states. The population of King County is predominantly white and enjoys a relatively high standard of living. In contrast, 44 percent of the population of Shelby County and 25 percent of the population of Cuyahoga County are African American. Fifteen percent of the households in Shelby County and 11 percent in Cuyahoga County live below the poverty level, as compared with 5 percent in Cuyahoga County.

All homicides involving residents of King County or Shelby County that occurred between August 23, 1987, and August 23, 1992, and all homicides involving residents of Cuyahoga County that occurred between January 1, 1990, and August 23, 1992, were reviewed to identify those that took place in the home of the victim. Any death ruled a homicide was included, regardless of the method used. Assault-related injuries that were not immediately fatal were included if death followed within three months. Cases of homicide involving children 12 years of age or younger were excluded at the request of the medical examiners.

Selection of Case Subjects and Recruitment of Case Proxies

A home was defined as any house, apartment, or dwelling occupied by a victim (i.e., a case subject) as that person's principal residence. Homicides occurring in adjacent structures (e.g., a ga-

Reprinted from the New England Journal of Medicine
329:1084-1091 (October 7, 1993)
rager) or the surrounding yard were also included. Murder–suicides and multiple homicides were considered a single event. In the case of a murder–suicide, the homicide victim was included if he or she was older than the suicide victim, in multiple homicides, the oldest victim was included.

Reports made at the scene were collected to ensure that study criteria were met. In King County, the medical examiner's staff conducted all investigations of the homicide scene. In Shelby County and Guaynabo County, police investigators conducted these investigations. In addition to recording the details of the incident for law enforcement purposes, investigators obtained the names of persons close to the victim who might provide us with an interview at a later date, thereby serving as proxies for the victim. These lists were supplemented with names obtained from newspaper accounts, obituary columns, and local newspaper reports.

Approximately three weeks after a victim's death, each proxy was sent a signed letter outlining the nature of the project. A $10 incentive was offered and a follow-up phone call made a few days later to arrange a time and place for an interview. At the time of this meeting, informed consent was obtained.

Selection and Recruitment of Controls

After each interview with a case proxy, we sought a control subject matched to the case subject according to sex, race, age range (15 to 24 years, 25 to 40 years, 41 to 60 years, and 61 years or older), and neighborhood of residence. To minimize selection bias, the controls were identified by a previously validated procedure for the random selection of a matching household in the neighborhood. After marking off a one-block avoidance zone around the home of the case subject, the interviewer started a neighborhood census at a randomly assigned point along a predetermined route radiating out from the case subject's residence. Households where no one was home were approached twice more, at different times of day and on different days of the week. If contact could not be established after three tries, no further efforts were made. After each neighborhood census was completed, an adult (a person 18 years old or older) in the first household with a member who met the matching criteria was offered a $10 incentive and asked to provide an interview. Whenever possible, attempts were made to interview a proxy for the actual matching control subject. When no interview was granted, the next matching household on the route was approached. If a closer match on the route was found on the second or third visit to the household, that household was interviewed. If no match was found, the interviewer proceeded to interview any earlier, more distant interviews were discarded. Overall, census data were obtained from 70 percent of the households approached to identify each match. Approximately 90 percent of the interviews were obtained from the closest matching household, 15 percent from the second, 3 percent from the third, and <1 percent from the fourth.

Interviews

Case and control interviews were identical in format, order, and content. Each was brief, highly structured, and arranged so that more sensitive questions were not broached until the later interview item drawn from the Short Michigan Alcoholism Screening Test. 11 the Pescosol-stened-Willits index of social position,12 and a 1978 poll of gun ownership by Decision Making Information 13 were included. Particularly sensitive questions were preceded by "permissive" statements, such as the following: "Many people have quarrels or fights. Has anyone in this household ever been hit or hurt in a fight in the home?"

Statistical Analysis

Data from reports prepared by medical examiners and police were used to describe the study population. Interview data were used for risk assessment, because these were collected in an analogous manner from the case proxies and matching control households. Since members of a household might acquire firearms or remove them from the home in response to a homicide in the neighborhood, answers were adjusted to reflect the state of affairs on the date of the homicide. Mantel–Haenszel chi-square analysis for matched pairs was used to calculate the crude odds ratio associated with each variable. Multivariate analyses used conditional logistic regression, the appropriate technique for a matched-pairs design.14 Potentially confounding variables were identified and controlled for by a two-step process. First, models containing closely related variables (such as those describing the use of alcohol in the home) were constructed to identify the variable or variables in each set that were most predictive of whether the household in question was a case or a control household. Next, a model that incorporated the variables selected in this initial step was constructed to select those that remained significant after we controlled for the effects of the remaining variables in the model. An additional model was constructed to look for interaction effects among the significant variables. Since no interaction terms significantly altered the adjusted odds ratios, the final model included six variables and was based on complete data from 316 matched pairs. After this analysis, an alternative modeling procedure was used to retain potentially confounding variables if they were even marginally significant (P<0.20). Although this approach added two variables, it did not significantly alter the adjusted odds ratios of the six included in our final model.

After completing this initial series of calculations, we examined the relationship between homicide in the home and gun ownership, using various strata of the full study sample. To limit bias resulting from potentially faulty reporting, one analysis was limited to pairs with a case interview obtained from a proxy who lived in the home of the victim. To determine whether gun ownership was associated with an increased risk of homicide by firearms as compared with homicide by other means, cases were stratified according to method. To discern whether guns in the home decrease the risk of an intruder-related homicide or increase the risk of being killed by a family member, additional analyses stratified according to circumstance and the relationship between the victim and the offender were also conducted. After these were completed, a comparable series of stratified analyses was performed to assess more clearly the relation between homicide and previous violence in the home.

RESULTS

Study Population

There were 1860 homicides in the three counties during the study period. Four hundred forty-four (23.9 percent) took place in the home of the victim. After we excluded the youngest victim in 19 double deaths, 2 homicides that were not reported to project staff, and 3 late changes to a death certificate, 420 cases (94.6 percent) were available for study.

Reports on the Scene

Most of the homicides occurred inside the victim's home (Table 1). Eleven percent occurred outside the home but within the immediate property lines. Two hundred sixty-five homicides (63.1 percent) were men; 36.9 percent were women. A majority of the homicides (50.9 percent) occurred in the context of a quarrel or a romantic triangle. An additional 4.5 percent of the victims were killed by a family member or an intimate acquaintance as part of a murder–suicide. Thirty-two homicides (7.6 percent) were related to drug dealing, and 92 homicides (21.9 percent) occurred during the commission of another felony, such as a robbery, rape, or burglary. No motive other than homicide could be established in 56 cases (13.3 percent).

The great majority of the victims (76.7 percent) were killed by a relative or someone known to them. Homicides by a stranger accounted for only 15 cases (3.6 percent). The identity of the offender could not be
established in 73 cases (17.4 percent). The remaining cases involved other offenders or police acting in the line of duty.

Two hundred nine victims (49.8 percent) died from gunshot wounds. A knife or some other sharp instrument was used to kill 111 victims (26.4 percent). The remaining victims were either bludgeoned (11.7 percent), strangled (6.4 percent), or killed by other means (5.7 percent).

Evidence of forced entry was noted in 59 cases (14.0 percent). Eighteen of these involved an unidentified intruder; six involved strangers. Two involved the police. The rest involved a spouse, family member, or some other person known to the victim.

Attempted resistance was reported in 184 cases (43.8 percent). In 21 of these (5.0 percent) the victim unsuccessfully attempted to use a gun in self-defense. In 56.2 percent of the cases no specific signs of resistance were noted. Fifteen victims (3.6 percent) were killed under legally excusable circumstances. Four were shot by police acting in the line of duty. The rest were killed by another member of the household or a private citizen acting in self-defense.

### Comparability of Case Subjects and Controls

Potential proxy respondents were identified for 405 of the 420 case subjects (96.4 percent). Interviews were obtained from 93 percent of those approached in Shelby County, 99 percent in Cuyahoga County, and 98 percent in King County. The households of those who agreed to be interviewed did not differ from the households of those who refused with respect to the age, sex, or race of the victim or the method of homicide (firearm vs. other).

Interviews with a matching control were obtained for 99.7 percent of the case interviews, yielding 388 matched pairs. Three hundred fifty-seven pairs were matched for all three variables, 27 for two variables, and 4 for a single variable (sex). The demographic characteristics of the victims and controls were similar, except that the case subjects were more likely to have rented their homes (70.4 percent vs. 47.3 percent) and to have lived alone (26.8 percent vs. 11.9 percent) (Table 2). Although efforts were made to conduct every interview in person, proxy respondents for the case subjects were much more likely than the controls to request a telephone interview (40.2 percent vs. 12.6 percent). Despite efforts to interview a proxy respondent for each control, only 48.2 percent of the control interviews were obtained in this manner.

### Univariate Analysis

Alcohol was more commonly consumed by one or more members of the households of case subjects than by members of the households of controls (Table 3). Alcohol was also more commonly consumed by the case subjects themselves than by their matched controls. Case subjects were reported to have manifested behavioral correlates of alcoholism (such as trouble at work due to drinking) much more often than matched controls. Illicit-drug use (by the case subject or another household member) was also reported more commonly by case households than control households.

Previous episodes of violence were reported more frequently by members of case households. When asked if anyone in the household had ever been hit or hurt in a fight in the home, 31.8 percent of the proxies for the case subjects answered affirmatively, as compared with only 5.7 percent of controls. Physical fights in the home while household members were drinking and fighting severe enough to cause injuries were rec

---

**Table 1. Characteristics of 420 Homicides Committed in the Homes of the Victims.**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scene</td>
<td></td>
</tr>
<tr>
<td>Inside residence</td>
<td>373 (88.8)</td>
</tr>
<tr>
<td>Outside residence</td>
<td>47 (11.2)</td>
</tr>
<tr>
<td>Sex of victim</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>155 (36.9)</td>
</tr>
<tr>
<td>Male</td>
<td>265 (63.1)</td>
</tr>
<tr>
<td>Age of victim</td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>15-24</td>
<td>140 (33.3)</td>
</tr>
<tr>
<td>25-34</td>
<td>260 (61.9)</td>
</tr>
<tr>
<td>35-44</td>
<td>41 (9.7)</td>
</tr>
<tr>
<td>45-54</td>
<td>106 (25.2)</td>
</tr>
<tr>
<td>55+</td>
<td>85 (20.2)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>140 (33.3)</td>
</tr>
<tr>
<td>Black</td>
<td>260 (61.9)</td>
</tr>
<tr>
<td>Native American, Eskimo, Aleut</td>
<td>4 (1.0)</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>7 (1.7)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (2.1)</td>
</tr>
<tr>
<td>Relationship of offender to victim</td>
<td></td>
</tr>
<tr>
<td>Spouse</td>
<td>70 (16.7)</td>
</tr>
<tr>
<td>Intimate acquaintance</td>
<td>58 (13.8)</td>
</tr>
<tr>
<td>First-degree relative</td>
<td>40 (9.5)</td>
</tr>
<tr>
<td>Other relative</td>
<td>12 (2.9)</td>
</tr>
<tr>
<td>Roommate</td>
<td>12 (2.9)</td>
</tr>
<tr>
<td>Friend or acquaintance</td>
<td>130 (31.0)</td>
</tr>
<tr>
<td>Police officer</td>
<td>4 (1.0)</td>
</tr>
<tr>
<td>Stranger</td>
<td>15 (3.6)</td>
</tr>
<tr>
<td>Unknown (unidentified suspect)</td>
<td>73 (17.4)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (1.4)</td>
</tr>
<tr>
<td>Method of homicide</td>
<td></td>
</tr>
<tr>
<td>Handgun</td>
<td>180 (42.9)</td>
</tr>
<tr>
<td>Rifle</td>
<td>10 (2.4)</td>
</tr>
<tr>
<td>Shotgun</td>
<td>10 (2.4)</td>
</tr>
<tr>
<td>Unknown firearm</td>
<td>111 (26.4)</td>
</tr>
<tr>
<td>Knife or sharp instrument</td>
<td>49 (11.7)</td>
</tr>
<tr>
<td>Blunt instrument</td>
<td>27 (6.4)</td>
</tr>
<tr>
<td>Strangulation or suffocation</td>
<td>10 (2.4)</td>
</tr>
<tr>
<td>Burns, smoke, scalding</td>
<td>14 (3.3)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Victim resisted assailant</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>184 (43.8)</td>
</tr>
<tr>
<td>No</td>
<td>140 (33.3)</td>
</tr>
<tr>
<td>Not noted</td>
<td>96 (22.9)</td>
</tr>
<tr>
<td>Evidence of forced entry</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>59 (14.0)</td>
</tr>
<tr>
<td>No</td>
<td>354 (84.3)</td>
</tr>
<tr>
<td>Not noted</td>
<td>7 (1.7)</td>
</tr>
<tr>
<td>Legally excusable circumstances</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15 (3.6)</td>
</tr>
<tr>
<td>No</td>
<td>403 (96.4)</td>
</tr>
</tbody>
</table>

*Because of rounding, not all percentages total 100.
portulated much more commonly by case proxies than controls. One or more members of the case households were also more likely to have been arrested or to have been involved in a physical fight outside the home than members of control households.

Similar percentages of case and control households reported using deadbolt locks, window bars, or metal security doors. The case subjects were slightly less likely than the controls to have lived in a home with a burglar alarm, but they were slightly more likely to have controlled security access. Almost identical percentages of households, but the case households were significantly more likely to have a handgun (35.7 percent vs. 23.3 percent; crude odds ratio, 1.9; 95 percent confidence interval, 1.4 to 2.7). Case households were also more likely than control households to contain a gun that was kept loaded or unlocked (crude odds ratio, 1.6; 95 percent confidence interval, 1.2 to 2.2). Shotguns and rifles were kept by similar people (Table 5). Restricting the analysis to pairs with data from case proxies who lived in the home of the victim demonstrated an even stronger association than that noted for the group overall. Gun ownership was most strongly associated with homicide at the hands of a family member or intimate acquaintance (adjusted odds ratio, 7.8; 95 percent confidence interval, 2.6 to 23.2). Guns were not significantly linked to an increased risk of homicide by acquaintances, unidentified intruders, or strangers. We found no evidence of a protective benefit from gun ownership in any subgroup, including one restricted to cases of homicide that followed forced entry into the home and another restricted to cases in which resistance was attempted. Not surprisingly, the link between gun ownership and homicide was due entirely to a strong association between gun ownership and homicide by firearms. Homicide by other means was not significantly linked to the presence or absence of a gun in the home.

Living in a household where someone had previously been hit or hurt in a fight in the home was also strongly and independently associated with homicide, even after we controlled for the effects of gun ownership and the other four variables in our final model (adjusted odds ratio, 4.4; 95 percent confidence interval, 2.2 to 8.8) (Table 4). Previous family violence was linked to an increased risk of homicide among men as well as women, blacks as well as whites, and younger as well as older people (Table 6). Virtually all of this increased risk was due to a marked association between prior domestic violence and homicide at the hands of a family member or intimate acquaintance (adjusted odds ratio, 20.4; 95 percent confidence interval, 3.9 to 104.6).

**DISCUSSION**

Although firearms are often kept in homes for personal protection, this study shows that the practice is counterproductive. Our data indicate that keeping a gun in the home is independently associated with an increase in the risk of homicide in the home. The use of illicit drugs and a history of physical fights in the home are also important risk factors. Efforts to increase home security have largely focused on preventing unwanted entry, but the greatest threat

---

**Table 2. Demographic Characteristics of 388 Pairs of Case Subjects and Controls.**

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>CASE SUBJECTS</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (%)</td>
<td>Male 63.1</td>
<td>Female 36.9</td>
</tr>
<tr>
<td>Race or ethnic group (%)</td>
<td>White 32.9</td>
<td>Black 62.1</td>
</tr>
<tr>
<td>Asian or Pacific Islander (%)</td>
<td>2.8</td>
<td>Other 1.0</td>
</tr>
<tr>
<td>Age group — yr (%)</td>
<td>15–24 13.1</td>
<td>25–40 40.2</td>
</tr>
<tr>
<td>Median years of education of household head</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Median socioeconomic status of household head</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Type of dwelling (%)</td>
<td>House 54.6</td>
<td>Other 45.4</td>
</tr>
<tr>
<td>Median no. of residents/room</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Telephone interview (%)</td>
<td>40.2</td>
<td>42.6</td>
</tr>
<tr>
<td>Proxy respondents interviewed</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*Because of rounding, not all percentages total 100.

*Socioeconomic status was measured according to the Hollingshead score on a scale of 1 to 5, with 1 in the highest score. [12]
to the lives of household members appears to come from within.

We restricted our study to homicides that occurred in the home of the victim, because these events can be most plausibly linked to specific individual and household characteristics. If, for example, the ready availability of a gun increases the risk of homicide, this effect should be most noticeable in the immediate environment where the gun is kept. Although our case definition excluded the rare instances in which a nonresident intruder was killed by a homeowner, our methodology was capable of demonstrating significant protective effects of gun ownership as readily as any evidence of increased risk.

Previous studies of risk factors for homicide have used approaches, the case–control method studies individual households or people. In contrast to these cohort or time-series designs to link rates of homicide to specific risk factors. However, hazards suggested by ecologic analysis may not hold at the level of individual households or people. In contrast to these approaches, the case–control method studies individual households or people. We employed correlational analysis or retrospective-cohort or time-series designs to link rates of homicide to specific risk factors. However, hazards suggested by ecologic analysis may not hold at the level of household characteristics. If, for example, the ready availability of a gun increases the risk of homicide, this effect should be most noticeable in the immediate environment where the gun is kept. Although our case definition excluded the rare instances in which a nonresident intruder was killed by a homeowner, our methodology was capable of demonstrating significant protective effects of gun ownership as readily as any evidence of increased risk.

Previous studies of risk factors for homicide have used approaches, the case–control method studies individual households or people. In contrast to these cohort or time-series designs to link rates of homicide to specific risk factors. However, hazards suggested by ecologic analysis may not hold at the level of individual households or people. In contrast to these approaches, the case–control method studies individual households or people. We employed correlational analysis or retrospective-cohort or time-series designs to link rates of homicide to specific risk factors. However, hazards suggested by ecologic analysis may not hold at the level of individual households or people. In contrast to these approaches, the case–control method studies individual households or people. We employed correlational analysis or retrospective-cohort or time-series designs to link rates of homicide to specific risk factors. However, hazards suggested by ecologic analysis may not hold at the level of individual households or people.

Although case–control studies offer many advantages over ecologic studies, they are prone to several sources of bias. To minimize selection bias, we included all cases of homicide in the home and rigorously followed an explicit procedure for randomly selecting neighboring control subjects. High response rates among case proxies (92.6 percent) and matching controls (80.6 percent) minimized nonresponse bias. Case respondents did not differ significantly from nonrespondents with regard to the age, sex, and race of the victim and the type of weapon involved. Although double homicides and murder–suicides were considered single events to avoid overrepresenting their effects, the number of cases excluded for this reason was small.

Other threats to the validity of the study were less easy to control. A respondent’s recollection of events can be powerfully affected by a tragedy as extreme as a homicide in the home. To diminish the effect of recall bias, we delayed our contact with the case proxies to allow for an initial period of grief. We also used a simple, forced-choice questionnaire to ascertain information in a comparable manner from case proxies and controls. We tried to obtain data on victims and controls as similarly as possible by interviewing proxy respondents for the controls whenever possible. Although we were able to do so only 48 percent of the time, the responses we obtained from this subgroup were consistent with those obtained from the study population overall.

Potential misreporting of sensitive information was a serious concern, since we had no way to verify each respondent’s statements independently. If case proxies or controls selectively withheld sensitive

Table 3. Univariate Analysis of Hypothesized Risk on Protection Factors Derived From Data on 368 Matched Pairs of Case Subjects and Controls.

<table>
<thead>
<tr>
<th>Variable</th>
<th>CASE SUBJECTS</th>
<th>CONTROLS</th>
<th>ODDS RATIO 95% CI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any household member drank alcoholic beverages</td>
<td>277 (73.3)</td>
<td>217 (55.9)</td>
<td>2.4 (1.7–3.3)</td>
</tr>
<tr>
<td>Case subject or control drank alcoholic beverages</td>
<td>238 (62.8)</td>
<td>162 (41.9)</td>
<td>2.6 (1.9–3.5)</td>
</tr>
<tr>
<td>Drinking caused problems in the household</td>
<td>92 (24.8)</td>
<td>22 (5.7)</td>
<td>7.0 (4.2–12.8)</td>
</tr>
<tr>
<td>Any household member had trouble at work because of drinking</td>
<td>32 (9.0)</td>
<td>3 (0.8)</td>
<td>10.7 (4.1–27.5)</td>
</tr>
<tr>
<td>Case subject or control had trouble at work because of drinking</td>
<td>20 (5.5)</td>
<td>1 (0.3)</td>
<td>20.0 (4.0–42.6)</td>
</tr>
<tr>
<td>Any household member hospitalized because of drinking</td>
<td>41 (11.4)</td>
<td>9 (2.3)</td>
<td>9.8 (4.2–22.5)</td>
</tr>
<tr>
<td>Case subject or control hospitalized because of drinking</td>
<td>28 (7.6)</td>
<td>2 (0.5)</td>
<td>14.0 (4.7–41.5)</td>
</tr>
<tr>
<td>Any household member used illicit drugs</td>
<td>111 (31.3)</td>
<td>23 (6.0)</td>
<td>9.0 (4.4–18.0)</td>
</tr>
<tr>
<td>Case subject or control used illicit drugs</td>
<td>74 (20.3)</td>
<td>16 (4.2)</td>
<td>6.8 (3.8–13.0)</td>
</tr>
<tr>
<td>Any physical fights in the home during drinking</td>
<td>92 (25.3)</td>
<td>13 (3.4)</td>
<td>8.9 (5.2–15.3)</td>
</tr>
<tr>
<td>Any household member hit or hurt in a fight in the home</td>
<td>117 (31.8)</td>
<td>22 (5.7)</td>
<td>7.9 (5.0–12.7)</td>
</tr>
<tr>
<td>Any family member required medical attention because of a fight in the home</td>
<td>62 (17.3)</td>
<td>8 (2.1)</td>
<td>10.2 (5.2–20.0)</td>
</tr>
<tr>
<td>Any adult household member involved in a physical fight outside the home</td>
<td>103 (29.0)</td>
<td>70 (18.8)</td>
<td>2.1 (1.4–3.0)</td>
</tr>
<tr>
<td>Any household member arrested</td>
<td>193 (52.7)</td>
<td>90 (23.4)</td>
<td>4.2 (3.0–6.0)</td>
</tr>
<tr>
<td>Case subject or control arrested</td>
<td>132 (36.0)</td>
<td>60 (15.7)</td>
<td>3.5 (2.4–5.2)</td>
</tr>
</tbody>
</table>

Environmental factors |               |          |                   |
| Home rented | 271 (70.4) | 181 (47.6) | 5.9 (3.8–9.2) |
| Public housing | 41 (11.3) | 38 (9.3) | 1.5 (0.7–3.3) |
| Case subject or control lived alone | 103 (28.6) | 46 (11.9) | 5.4 (2.2–5.3) |
| Deadbolt locks | 243 (66.8) | 202 (53.5) | 0.8 (0.5–1.0) |
| Windows broken | 71 (19.2) | 41 (20.9) | 0.8 (0.5–1.3) |
| Metal security door | 95 (25.4) | 104 (26.8) | 0.9 (0.6–1.3) |
| Burglar alarm | 26 (7.1) | 43 (11.1) | 0.6 (0.4–1.0) |
| Controlled security access to residence | 52 (13.9) | 38 (9.8) | 2.3 (1.2–4.4) |
| Dog or dogs in home | 94 (24.2) | 87 (22.4) | 1.1 (0.8–1.6) |
| Cat or other pets in home | 174 (45.4) | 139 (35.8) | 1.6 (1.2–2.3) |
| Handgun | 135 (35.7) | 90 (23.3) | 1.9 (1.4–2.7) |
| Shotgun | 50 (13.6) | 65 (16.8) | 0.7 (0.5–1.1) |
| Rifle | 45 (12.2) | 54 (13.9) | 0.8 (0.5–1.3) |
| Any gun kept unloaded | 105 (29.0) | 69 (17.8) | 2.4 (1.4–3.0) |
| Any gun kept loaded | 93 (26.0) | 48 (12.5) | 2.7 (1.8–4.0) |
| Guns kept primarily for self-defense | 125 (32.6) | 86 (22.2) | 1.7 (1.2–2.4) |

*Results were calculated with the Mantel–Haenszel chi-square analysis for matched pairs. CI denotes 95% confidence interval.

Percentage reflects the proportion of subjects who responded yes among all subjects who gave a response.
information about illicit-drug use, alcoholism, or violence in the home, inaccurate estimates of risk could result. We attempted to minimize this problem by re-assuring our respondents of the confidentiality of their responses. We also placed "permissive" statements before each potentially intrusive question to encourage honest replies. Very few respondents refused to answer our questions, although all were assured that they were free to do so.

The rate of domestic violence reported by our control respondents was somewhat less than that noted in a large telephone survey. This may be due to regional or temporal differences in rates of battering, variations in the way we phrased our questions (e.g., screening as compared with an exploratory line of inquiry), or the increased anonymity afforded by telephone interviews as compared with our face-to-face encounters.

Underreporting of gun ownership by control respondents could bias our estimate of risk upward. We do not believe, however, that misreporting of gun ownership was a problem. In two of our three study communities, a pilot study of homes listed as the address of handgun owners confirmed that respondents' answers to questions about gun ownership were generally valid. Furthermore, the rate of gun ownership reported by control respondents in each study community was comparable to estimates derived from previous surveys and Cook's gun-prevalence index.

Four limitations warrant comment. First, our study was restricted to homicides occurring in the home of the victim. The dynamics of homicides occurring in other locations (such as bars, retail establishments, or the street) may be quite different. Second, our research was conducted in three urban counties that lack a substantial percentage of Hispanic citizens. Our results may therefore not be generalizable to more rural communities or to Hispanic households. Third, it is possible that reverse causation accounted for some of the association we observed between gun ownership and homicide — i.e., in a limited number of cases, people may have acquired a gun in response to a specific threat. If the source of that threat subsequently caused the homicide, the link between guns in the home and homicide may be due at least in part to the failure of these weapons to provide adequate protection from the assailants. Finally, we cannot exclude the possibility that the association we observed is due to a third, unidentified factor. If, for example, people who keep guns in their homes are more psychologically prone to violence than people who do not, this could explain the link between gun ownership and homicide in the home. Although we examined several behavioral markers of violence and aggression and included two in our final logistic-regression model, "psychological confounding" of this sort is difficult to control for. "Psychological autopsies" have been used to control for psychological differences between adolescent victims of suicide and inpatient controls with psychiatric disorders, but we did not believe this approach was practical for a study of homicide victims and neighborhood controls. At any rate, a link between gun ownership and any psychological tendency toward violence or victimization would have to be extremely strong to account for an adjusted odds ratio of 2.7.

Given the univariate association we observed between alcohol and violence, it may seem odd that no alcohol-related variables were included in our final multivariate model. Although consumption of alcoholic beverages and the behavioral correlates of alcoholism were strongly associated with homicide, they were also related to other variables included in our final model. Forcing the variable "case subject or control drinks" into our model did not substantially alter

### Table 4. Variables Included in the Final Conditional Logistic-Regression Model Derived from Data on 316 Matched Pairs of Case Subjects and Controls.*

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>ADJUSTED ODDS RATIO (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home renter</td>
<td>4.4 (2.3–8.2)</td>
</tr>
<tr>
<td>Case subject or control</td>
<td>3.7 (2.1–6.6)</td>
</tr>
<tr>
<td>Any household member hit or hurt in a fight in the home</td>
<td>4.4 (2.2–8.8)</td>
</tr>
<tr>
<td>Any household member arrested</td>
<td>2.5 (1.6–4.1)</td>
</tr>
<tr>
<td>Any household member used illicit drugs</td>
<td>5.7 (2.6–12.6)</td>
</tr>
<tr>
<td>Gun or guns kept in the home</td>
<td>2.7 (1.6–4.4)</td>
</tr>
</tbody>
</table>

*Conditional logistic-regression analyses require that data on all the variables of interest be available for both case subjects and their matched controls. Therefore, 72 pairs with missing data on any of the six variables of interest were excluded from this analysis. CI denotes confidence interval.

Table 5. Homicide in the Home in Relation to Gun Ownership, According to Subgroup.

<table>
<thead>
<tr>
<th>SUBGROUP</th>
<th>No. or Pair</th>
<th>ADJUSTED ODDS RATIO (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>121</td>
<td>3.6 (1.6–8.1)</td>
</tr>
<tr>
<td>Male</td>
<td>195</td>
<td>2.3 (1.1–4.6)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>103</td>
<td>2.7 (1.0–6.9)</td>
</tr>
<tr>
<td>Black</td>
<td>196</td>
<td>2.9 (1.3–5.7)</td>
</tr>
<tr>
<td>Age (yr)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15–40</td>
<td>169</td>
<td>3.4 (1.4–8.0)</td>
</tr>
<tr>
<td>&gt;40</td>
<td>147</td>
<td>2.3 (1.2–4.6)</td>
</tr>
<tr>
<td>Suspect related to or intimate with victim</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>138</td>
<td>7.8 (2.6–23.2)</td>
</tr>
<tr>
<td>No</td>
<td>178</td>
<td>1.8 (1.0–3.4)</td>
</tr>
<tr>
<td>Evidence of forced entry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>46</td>
<td>2.5 (0.7–8.4)</td>
</tr>
<tr>
<td>No</td>
<td>219</td>
<td>2.8 (1.3–5.2)</td>
</tr>
<tr>
<td>Victim resisted assailant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>141</td>
<td>3.0 (1.3–6.2)</td>
</tr>
<tr>
<td>No</td>
<td>105</td>
<td>3.1 (1.2–8.1)</td>
</tr>
<tr>
<td>Method of homicide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firearms</td>
<td>159</td>
<td>4.8 (2.2–10.3)</td>
</tr>
<tr>
<td>Other</td>
<td>157</td>
<td>1.2 (0.5–2.7)</td>
</tr>
</tbody>
</table>

*All results were calculated by conditional logistic regression after control for the covariates listed in Table 4. CI denotes confidence interval.

*The value is statistically significant; the lower bound of the 95 percent confidence interval is 1.0 because of rounding.
Table 6. Homicide in the Home in Relation to Prior Domestic Violence, According to Subgroup.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>No.</th>
<th>Adjusted Odds Ratio (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-40</td>
<td>169</td>
<td>5.2 (1.7-16.0)</td>
</tr>
<tr>
<td>&gt;40</td>
<td>147</td>
<td>4.5 (1.7-12.0)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>121</td>
<td>4.4 (1.6-11.9)</td>
</tr>
<tr>
<td>Male</td>
<td>195</td>
<td>4.4 (1.5-12.6)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>103</td>
<td>6.9 (1.7-27.6)</td>
</tr>
<tr>
<td>Black</td>
<td>196</td>
<td>2.9 (1.2-7.3)</td>
</tr>
</tbody>
</table>

*All results were calculated by conditional logistic regression after control for the covariates listed in Table 4. CI denotes confidence interval.

The adjusted odds ratios for the other variables. Furthermore, the adjusted odds ratio for this variable was not significantly greater than 1.

Large amounts of money are spent each year on home-security systems, locks, and other measures in- the adjusted odds ratios for the other variables. Furthermore, the adjusted odds ratio for this variable was not significantly greater than 1.

Large amounts of money are spent each year on home-security systems, locks, and other measures in- tended to improve home security. Unfortunately, our results suggest that these efforts have little effect on the risk of homicide in the home. This finding should come as no surprise, since most homicides in the home involve disputes between family members, intimate acquaintances, friends, or others who have ready ac- cess to the home. It is important to realize, however, that these data offer no insight into the effectiveness of home-security measures against other household crimes such as burglary, robbery, or sexual assault. In a 1983 poll, Seattle homeowners feared "having someone break into your home while you are gone" 4th on a list of 16 crimes. Although homicide is the most serious of crimes, it occurs far less frequently than other types of house- hold crime. Measures that make a home more diffi- cult to enter are probably far more effective against these crimes.

Despite the widely held belief that guns are effective for protection, our results suggest that they actually pose a substantial threat to members of the household. People who keep guns in their homes appear to be at greater risk of homicide in the home than people who do not. Most of this risk is due to a substantially greater risk of homicide at the hands of a family member or intimate acquaintance. We did not find evidence of a protective effect of keeping a gun in the home, even in the small subgroup of cases that involved forced entry. Saltzman and colleagues recently found that as- saults by family members or other intimate acquaint- ances with a gun are far more likely to end in death than those that involve knives or other weapons. A gun kept in the home is far more likely to be in- volved in the death of a member of the household than it is to be used to kill in self-defense. Cohort and interrupted time-series studies have demonstrated a strong link between the availability of guns and community rates of homicide. Our study con- firms this association at the level of individual house- holds.

Previous case-control research has demonstrated a strong association between the ownership of firearms and suicide in the home. Also, unintentional shooting deaths can occur when children play with loaded guns they have found at home. In the light of these observations and our present findings, people should be strongly discouraged from keeping guns in their homes.

The observed association between battering and homicide is also important. In contrast to the money spent on firearms and home security, little has been done to improve society's capacity to respond to the problem of domestic violence. In the absence of effective intervention, battering tends to increase in frequency and severity over time. Our data strongly suggest that the risk of homicide is markedly in- creased in homes where a person has previously been hit or hurt in a family fight. At the very least, this observation should prompt physicians, social work- ers, law-enforcement officers, and the courts to work harder to identify and protect victims of battering and other forms of family violence. Early identification and effective intervention may prevent a later homici- dle.

We are indebted to the men and women of the following law-enforcement agencies and offices for their support of this project: in Shelby County, Tennessee, the Memphis Police Department, Shelby County Sheriff's Department, Bartlett Police Department, Col- lierville Police Department, Germantown Police Department, Mill- ington Police Department, and Shelby County Medical Examiner's Office, in Cayuga County, Ohio, the Cleveland Police Depart- ment and Cayuga County Coroner's Office; and in King County, Washington, the Seattle Police Department, Bellevue Police De- partment, King County Sheriff's Department, and King County Medical Examiner's Office. Without their assistance, this work would not have been possible. We are also indebted to Noel Weiss and William Applegate for their comments and suggestions, to Viv- ian C. Driscoll and Steven Walker for their help with data collec- tion, and to LaGenia Betts for her assistance in the preparation of the manuscript.

References


©Copyright, 1993, by the Massachusetts Medical Society
Printed in the U.S.A.