

# A Review of the Research on Gun Injuries

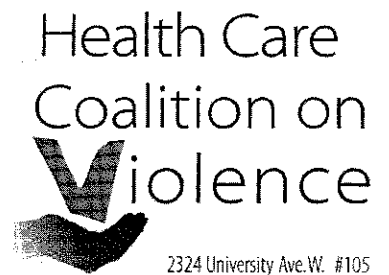
## *Promising Prevention Strategies for Health Care*



PREPARED BY:  
DATA AND RESEARCH  
COMMITTEE  
MINNESOTA'S HEALTH  
CARE COALITION ON  
VIOLENCE

*“One can be anti-gun injuries and  
not be anti-gun. There’s a safe and  
sane and reasonable middle there  
that people forget about.”*

*—Kellermann, 1996*



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May 2000


Dear Colleague,

Nearly 800 people are known to have been injured by guns in Minnesota in 1998; more than a third of them died. The people who didn't die immediately were treated in hospitals, emergency departments, and clinics. Traditionally, that has been the major contribution of health care—to try to undo the damage caused by guns. Many providers have felt frustrated by this important but limited role, and have looked for opportunities to be more proactive and prevent these injuries from ever occurring.

Our report, *A Review of the Research on Gun Injuries: Promising Prevention Strategies for Health Care*, provides information not only on the scope of the problem of gun injuries in Minnesota, but identifies critical roles for health care providers and systems in preventing these deaths and injuries.

National and local experts were surveyed and asked: What can health care do to prevent violence from guns? Four key strategies were identified: gun safety counseling for patients and their families, training for providers on how to counsel patients effectively, system-wide data collection, and advocacy for policies that decrease gun violence. The report assesses the effectiveness of these strategies and makes recommendations to advance this work.

We invite you to examine the report's findings and to work with us on implementing its recommendations.

Sincerely,  
  
David Strand, Chairman  
Board of Directors

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## EXECUTIVE SUMMARY

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Gun-related injuries are the second leading cause of injury death in the United States, surpassed only by motor vehicle deaths. Like motor vehicle deaths, gun injuries and deaths are preventable. Yet, from 1988 to 1997, a total of 3,529 Minnesotans lost their lives to guns. Health care providers and health care systems have opportunities to prevent gun-related injuries and deaths.

In Minnesota, suicide is the leading cause of gun deaths and disproportionately affects both young and elderly men. Homicide and unintentional gun deaths also most commonly affect young men. Guns are also involved in non-fatal injuries. Nationally, 2.6 nonfatal gun injuries required emergency department treatment or inpatient hospitalization for every one fatal injury. In 1998, there were 483 non-fatal gun-related injuries in Minnesota that required treatment in emergency departments or hospitals (many more injuries are treated and not reported or are treated in clinics). Those injuries reported were predominantly unintentional (51 percent) or assault related (34 percent) and, again, disproportionately affected young men. These injuries exact a tremendous toll on the individual victims; but they are also costly for health care and society. A national study found that the average lifetime medical costs are \$17,000 per gun shot injury. This amounted to \$2.3 billion for the nation in 1994.

Studies have shown that guns in the home increase the risk for homicide, suicide, and unintentional death. Despite these risks, 48 percent of Minnesotans report keeping at least one gun in their home. The risk increases when the gun is stored unlocked or loaded. A national study found that 11 percent of homes with both guns and children keep at least one loaded and unlocked gun.

Gun-related injuries are a significant health care issue. Injured patients enter the health care system for treatment and rehabilitation. Until recently, health care systems and providers have not considered it their role to prevent gun injuries. The goal of this report is to identify the prevention strategies that health care systems and providers can implement or support, and to assess the effectiveness of these strategies through a research review. Prevention strategies were identified by an initial structured interview with 18 national and local gun injury experts. Experts were contacted a second time to rank the importance of each of the strategies identified in the initial interviews. The four most highly recommended strategies were:

- Train health care providers to provide effective gun safety counseling;
- Provide gun safety counseling to patients and their families;
- Collect data on gun injuries and deaths for surveillance and to identify risk factors for the development of prevention strategies;
- Advocate for policies that are effective at reducing gun-related injuries and deaths.

### **Counseling and Training**

A thorough literature search revealed that little evaluation has been conducted on the effectiveness of these strategies. Of 16 research articles related to gun safety counseling, only three studies evaluated an intervention. Although limited, research on patient and health care provider attitudes and beliefs about gun safety counseling is informative. For example:

- Physicians and nurse practitioners believe they should counsel patients.
- Physicians are not trained to counsel patients on gun-related topics.
- 48 to 52 percent of physicians never counsel their patients about gun safety.
- The two largest barriers to counseling are: lack of time and not knowing what to say.
- Physicians also own guns and some do not store them safely.
- Physicians are more comfortable counseling about safe storage than removal of guns.
- Most parents report that they will listen to physicians and follow their advice.

### **Data Collection**

Health care systems can also be part of the solution for decreasing gun injuries and deaths by collecting data on gun-related injuries and deaths. Data are needed to understand the prevalence of gun injuries and deaths, risk factors, and to evaluate interventions. Providers can improve data through better documentation on medical charts. Health care systems can participate in surveillance systems.

### **Advocacy**

Both health care providers and health care systems can have a role in advocacy and influence policies related to guns. Unfortunately, no studies were identified that evaluated the effectiveness of gun-related advocacy efforts. Multiple policies have been advanced making it difficult to recommend an advocacy agenda. One approach recommended by researchers is to focus on strategies that impact the manufacture, marketing, and sale of guns.

Health care providers and health care systems have an important role to play in preventing gun-related injuries and deaths. Four key strategies that need to be undertaken are: training health care providers on how to counsel patients on gun safety; counseling patients on gun safety; collecting and sharing data on gun injuries and deaths; and advocating for effective policies and laws. To be successful, evaluations need to be conducted and information shared on what works in preventing gun-related injuries and deaths. If health care systems and health care providers implement these strategies, they will contribute to a reduction in gun-related injuries and deaths.

## **ABOUT THIS REVIEW**

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### **Purpose of the Review of the Research on Gun Injuries**

One purpose of this review is to discover, through expert opinion and review of relevant research, “what works” in preventing gun-related injuries, specifically as it relates to strategies that health care systems and providers can implement or impact. The second purpose of the report is to identify what additional gun injury research is needed.

### **Who Should Read This Review**

This review is focused on the role that the private health care system can play in reducing gun injuries; therefore it is primarily targeted toward people who work in the health care system, including physicians, nurses, and administrators. However, because this report focuses on gun injury research, it will also be of interest to others, including community leaders, public health professionals, researchers, and legislators.

### **Public Health Approach**

This committee studied gun injuries from a public health approach. Typically, the public health approach utilizes three broad strategies to reduce injuries. These strategies are:

- **Engineering:** Reducing the risk of injury through protective equipment or environmental modification (e.g., installing trigger locks, seatbelts)
- **Education:** Changing the behavior of individuals or community norms through public awareness, role modeling, and skill development (e.g., media campaigns on the risks of having a gun in the home or dangers of drinking and driving)
- **Enforcement:** Mandating the removal of a hazard or modifying a product (e.g., raising taxes for gun sales or laws for motor vehicle speed limits)

### **What is Included in This Review**

This review provides an overview of the data on gun injuries and deaths in Minnesota and the United States. Information is included on gun ownership, risk factors for violent death, and the costs of treating gun injuries. Data are followed by a summary of gun and violence experts’ opinions on health care’s role in preventing gun injuries and deaths. The final portion of the report is a review of the literature on the four strategies suggested by the experts. This review includes a research agenda as well as recommendations and resources for health care providers and health care systems. The Appendix includes evidence tables with more complete information about the research articles.

# PART I

## The Data

### *Gun Injuries and Deaths*



## **GUN INJURIES AND DEATHS**

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Gun-related deaths are the second leading cause of injury death in the United States (Centers for Disease Control and Prevention, 1999) and the fourth leading cause of years of potential life lost before age 65 (as cited in Ikeda, Gorwitz, James, Powell, and Mercy, 1997). Deaths and injuries from guns disproportionately affect males, the young, and the elderly.

Like other injuries, gun-related injuries and deaths are preventable (Rosenberg and Hammond, 1998). The public health approach to preventing injuries starts with a review of the relevant data to identify trends and risk factors. Then, interventions, which seek to reduce risk factors are developed, tested, and evaluated. Data are used throughout the process. This report begins with a review of the relevant data on gun-related injuries and deaths.

### **Terminology: Guns versus Firearms**

“All firearms are guns, but not all guns are firearms.”

—Karlson and Hargarten, 1997

Firearms refer only to guns that use a powder charge to fire a projectile. Common firearms include rifles, shotguns, and handguns. We chose to use the term gun for this report because it is more encompassing and also includes guns that are fired by compressed air or carbon dioxide, such as air rifles, air guns, and BB guns.

## **MORTALITY DATA<sup>▲</sup>**

### **United States**

Between 1988 and 1997, guns claimed 362,547 lives (a rate of 14.15 per 100,000 persons annually).

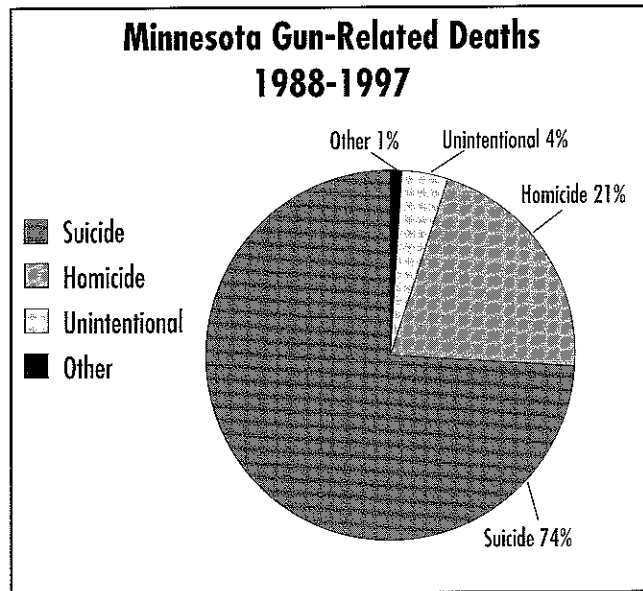
- 183,867 were suicides (a rate of 7.18 per 100,000 persons annually)
- 158,181 were homicides (a rate of 6.17 per 100,000 persons annually)
- 13,473 were unintentional (a rate of 0.53 per 100,000 persons annually)
- 7,026 were other<sup>◆</sup> (a rate of 0.27 per 100,000 persons annually)

### **Minnesota**

Between 1988 and 1997, guns claimed 3,529 lives (a rate of 7.85 per 100,000 persons annually).

<sup>▲</sup> Mortality data (excluding the three charts that show Minnesota data by geography) were obtained from the Centers for Disease Control and Prevention Compressed Mortality database on April 12, 2000. Minnesota mortality data by geography were obtained from the Minnesota Department of Health, Center for Health Statistics, March 2000. Population estimates used to calculate rates for Minnesota data by geography were obtained from the Minnesota Planning State Demographic Center, April 2000 and K. Johnson (personal communication, April 10, 2000).

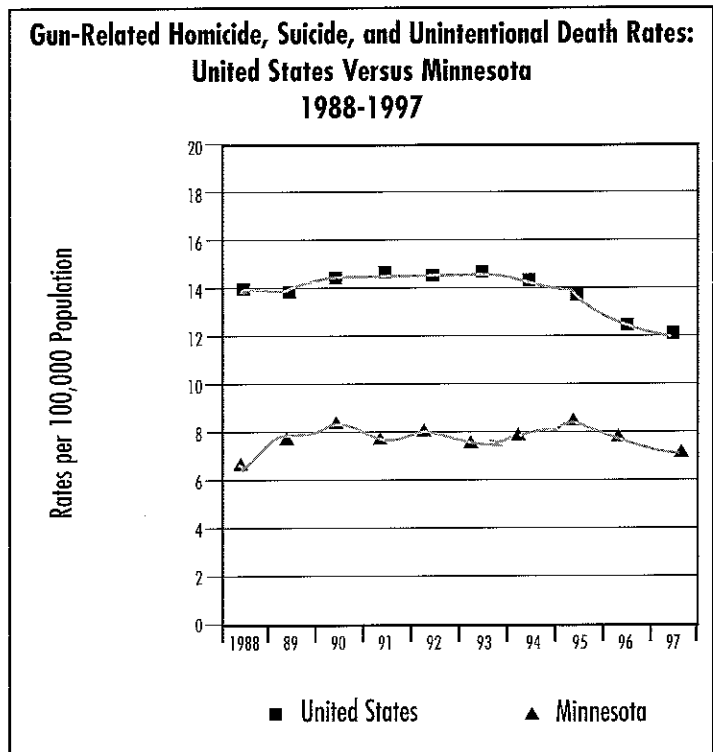
<sup>◆</sup> other includes undetermined, injuries due to war, and injuries due to legal intervention.



- 2,592 were suicides (a rate of 5.77 per 100,000 persons annually)
- 747 were homicides (a rate of 1.66 per 100,000 persons annually)
- 138 were unintentional (a rate of 0.31 per 100,000 persons annually)
- 52 were other (a rate of 0.12 per 100,000 persons annually)

### Differences Between the United States and Minnesota

- Gun-related suicide, homicide, and unintentional death rates are consistently higher at the national level.
- In the U.S., 51 percent of all gunrelated deaths are from suicides, compared to 74 percent in Minnesota.
- In the U.S., 44 percent of all gunrelated deaths are from homicides, compared to 21 percent in Minnesota.



## Minnesota: Gun-Related Suicides 1988-1997

### By Gender

Similar to national trends, males in Minnesota committed suicide with guns at much higher rates than females.

- Males in Minnesota were more than ten times as likely to kill themselves with a gun as females between 1988 and 1997. During this time, 2,365 males killed themselves with a gun (a rate of 10.69 per 100,000 persons annually) compared to 227 females (a rate of 0.99 per 100,000 persons annually).

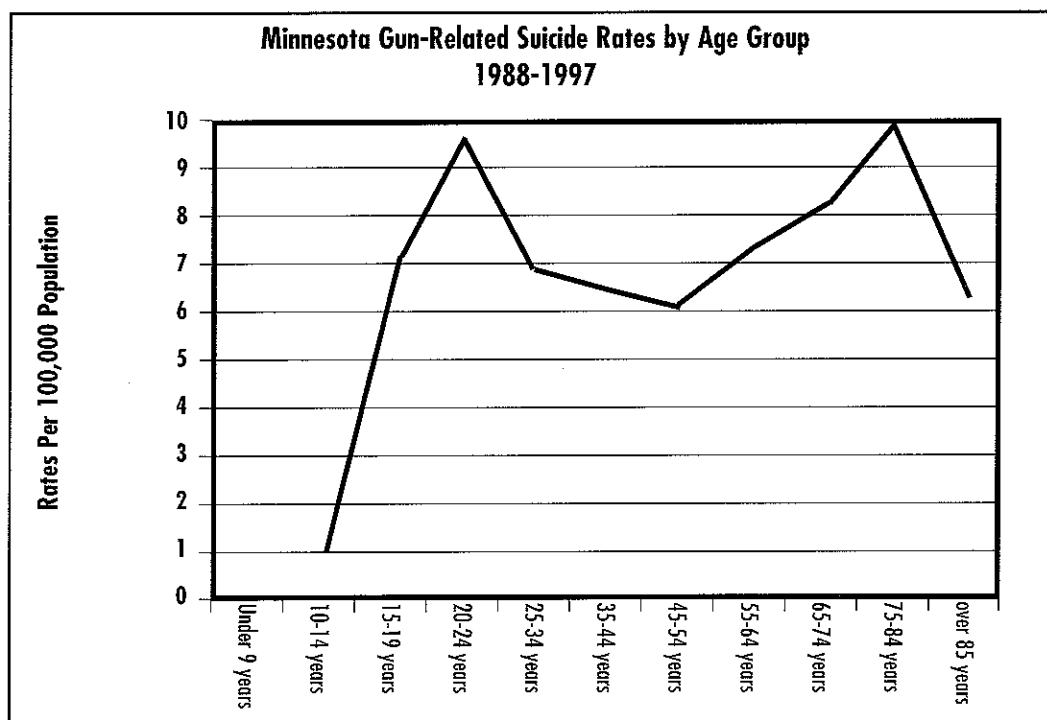
### By Race and Gender

White males, followed by males of color, are at the highest risk for gun-related suicide. White males commit suicide with guns at almost twice the rate of males of color.

- 2,280 white males committed suicide with guns (a rate of 10.94 per 100,000 persons annually) compared to 85 males of color (a rate of 6.66 per 100,000 persons annually).
- Rates among white females (a rate of 0.99 per 100,000 persons annually) and females of color (numbers too small to calculate a reliable rate) are extremely low in comparison.

### By Age

Rates are highest among the elderly and young adults. Too few children under nine years of age are victims of gun-related suicides to calculate reliable rates.

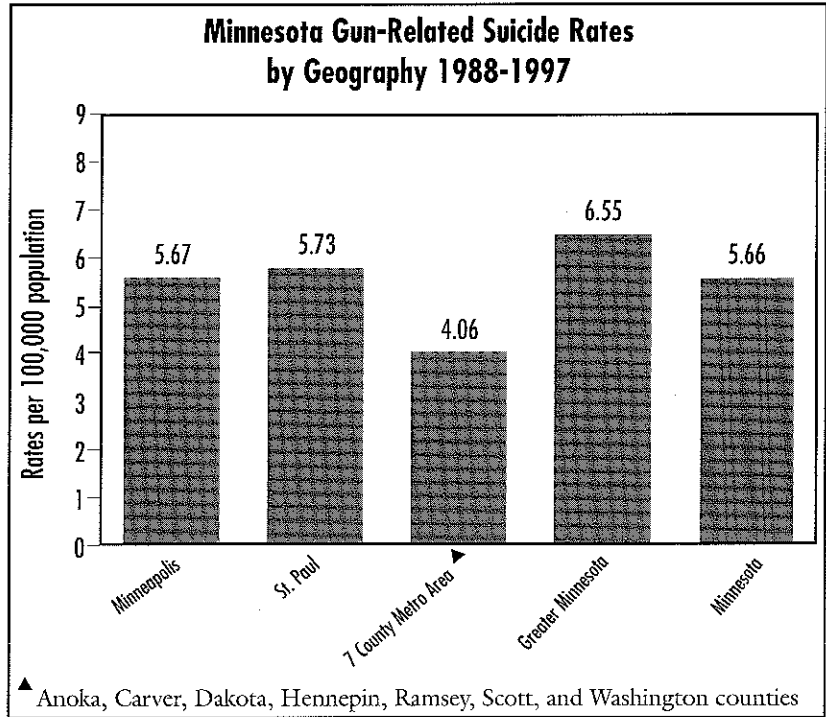


### By Age, Race, and Gender

- The rate for white males ages 75 to 84 is the highest at 25 per 100,000 persons annually.

**By Geography**

- Gun-related suicides are highest in Greater Minnesota and lowest in the suburban 7-county metro area.



**Minnesota: Gun-Related Homicides 1988-1997**

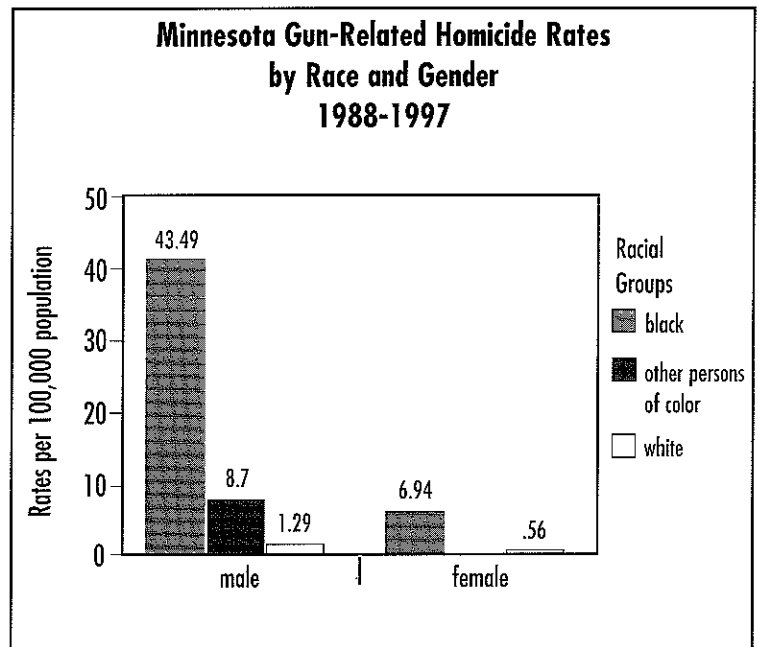
**By Gender**

Males are at a much higher risk for gun-related homicides than females.

- Males in Minnesota are more than three times as likely to be the victim of a gun-related homicide as females; 577 males were the victims of a homicide (a rate of 2.6 per 100,000 persons annually) compared with 170 females (a rate of 0.74 per 100,000 persons annually).

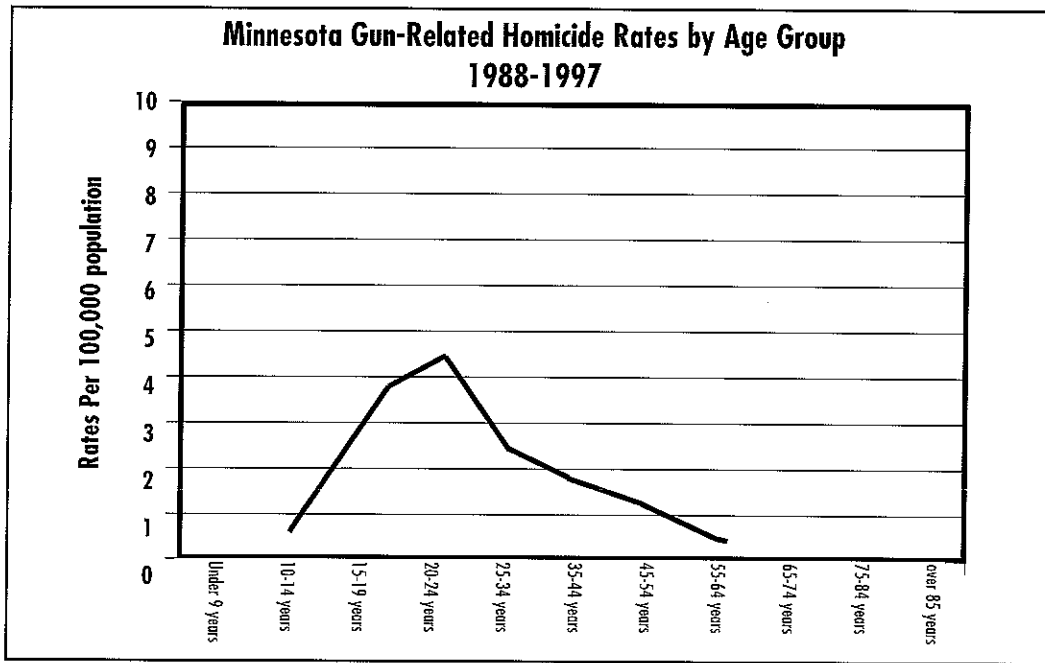
**By Race and Gender**

- The gun-related homicide rate among black males was more than 33 times that of white males and five times that of other males of color.
- The gun-related homicide rate among black females was more than 12 times that of white females.
- Too few other females of color were victims of homicide to make reliable comparisons.



**By Age**

The highest rate of gun-related homicide was among the 20-24 age group. Too few children under nine years of age and adults over age 65 are victims of homicide to calculate reliable rates.

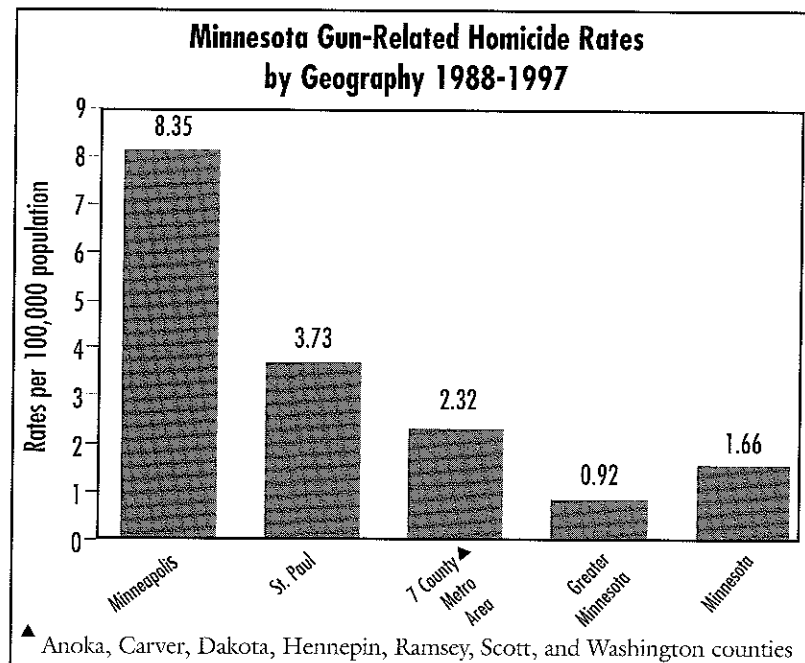


**By Age, Race, and Gender**

- Black males ages 20 to 24 have the highest rate of homicide at 144.21 per 100,000 persons annually. This is more than 62 times the rate for white males ages 20 to 24 (2.32 per 100,000 persons annually) and is slightly higher than the national rate for black males ages 20 to 24 (142.72 per 100,000 persons annually).
- Black males ages 15 to 19 also have an extremely high rate at 111.82 per 100,000 persons annually.

**By Geography**

- The gun-related homicide rate is five times higher in Minneapolis than the state as a whole.
- Greater Minnesota has the lowest gun-related homicide rate of anywhere in the state.



## Minnesota: Unintentional Gun-Related Deaths 1988-1997

### By Gender

The rates of unintentional gun-related deaths are low compared with homicides and suicides. As with other gun-related deaths, unintentional gun-related deaths are experienced disproportionately by males.

### By Race and Gender

The number of unintentional gun-related deaths was too low to calculate rates across race and gender.

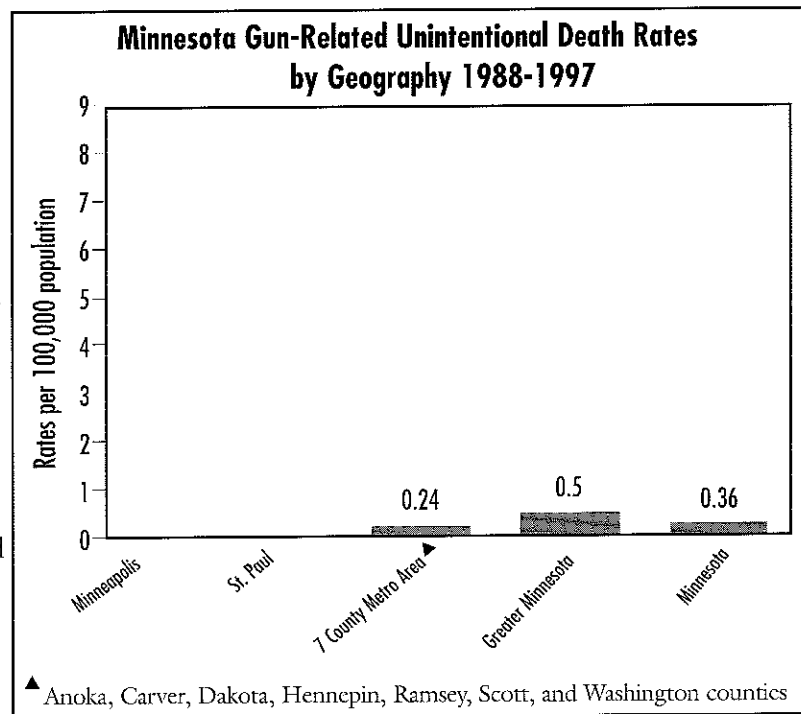
- 110 white males (a rate of 0.52 per 100,000 persons annually)
- 9 black males
- 11 other males of color

### By Age

The highest rate of unintentional gun-related deaths is experienced among the 15-19 age group (.82 per 100,000 persons annually). Too few unintentional gun-related deaths occurred to calculate reliable rates across most age groups.

### By Geography

- Gun-related unintentional deaths are highest in Greater Minnesota and lowest in the 7-county metro area.
- Too few unintentional gun-related deaths occurred in Minneapolis and Saint Paul to calculate reliable rates.



## Risk Factors for Violent Death

**Suicide:** Younger and older males are at the greatest risk for gun-related suicide with higher rates for white males. Two studies of suicide in the home have identified additional risk factors (not listed in order of importance):

- having one or more guns in the home
- history of mental illness
- living alone
- failure to graduate from high school
- consumption of alcoholic beverages
- previous hospitalization due to drinking
- current use of prescription medication for depression or mental illness
- use of illicit drugs

(Bailey et al, 1997; Kellermann et al, 1992)

**Homicide:** Young black men are at the greatest risk for gun-related homicide as demonstrated by their high rates of death from homicide in both Minnesota and nationally. Additional risk factors identified in studies of homicide in the home are (not listed in order of importance):

- having one or more guns in the home
- rented home
- living alone
- any household member ever hit or hurt in a fight in the home
- prior domestic violence
- any household member ever arrested
- any household member ever used illicit drugs

(Bailey et al, 1997; Kellermann et al, 1993)

## MORBIDITY DATA<sup>^</sup>

### A Comparison of Fatal to Nonfatal Gun-Related Injuries

To determine the magnitude of gun injuries, nonfatal gun-related injuries, as well as fatal, must be examined. In the recent past, injury data have been available in Minnesota only for fatal injuries. Yet, deaths from gun injuries represent only the tip of the iceberg. On average, for every death from an injury, there are an estimated: 19 hospitalizations, 233 emergency department visits, 450 physician-based office visits, and an unknown number of people who are injured and never seek treatment (Burt, 1995).

Gun shot wounds, however, are different from other injuries because the ratio of nonfatal to fatal injuries is much lower (Annest, Mercy, Gibson, and Ryan, 1995). A national study, which included only firearm injuries, found a ratio of 2.6 firearm injuries requiring emergency department treatment or hospitalization to every one fatality (Annest et al, 1995). In Minnesota, in 1998 the overall ratio was 1.3 documented nonfatal firearm injuries to every documented death. When air gun injuries are included the ratio is 1.6 nonfatal injuries to each fatality.

<sup>^</sup> Minnesota morbidity data and 1998 mortality data are unpublished data that were obtained from the Minnesota Department of Health Injury and Violence Prevention Unit from March 31 to April 20, 2000.

## A REVIEW OF THE RESEARCH ON GUN INJURIES

The ratio of injuries to deaths varies by intent (homicide, suicide, unintentional). Using national data, unintentional events have the highest ratio of injuries to deaths with 13 injuries to one death; for assaults, the ratio is 3.3 injuries to one death; and, for suicides, the ratio is only 0.3 injuries to every death (Annest et al, 1995). In Minnesota, in 1998 there were 51.3 unintentional injuries reported for every firearm-related unintentional death; 3.2 assault injuries reported for every homicide; and 0.1 self-inflicted injuries reported for every suicide. Air gun injuries are predominantly unintentional and resulted in no fatalities in Minnesota in 1998. The ratio of unintentional injuries to deaths increases to 82.3 injuries to each death when air gun injuries are included.

### Nonfatal Gun-Related Injuries in Minnesota<sup>▲</sup>

In 1998, Minnesota hospitals reported 483 gunshot injuries (including 99 air gun injuries) that required an inpatient hospitalization or emergency department visit. Among fatalities, suicide was the leading cause of gun deaths (81 percent). Among non-fatal gun-related injuries, unintentional (51 percent) and assaults (34 percent) were the leading cause of injury (see Table 1). Severity of injury varies by intent (see Table 1). The leading cause of gun-related inpatient hospitalization is assaults and the leading cause of gun-related emergency department visits is unintentional injuries.

	Fatal	Percent of Total	Inpatient*	Percent of Total	ED Visits**	Percent of Total	Total (nonfatal only)	Percent of Total
Homicides/Assaults	52	18%	115	60%	50	17%	165	34%
Suicides/Suicide attempts	240	81%	22	12%	5	2%	27	6%
Unintentional	3	1%	41	21%	206	71%	247	51%
Undetermined	2	1%	14	7%	30	10%	44	9%
Total	297	100%	192	100%	291	100%	483	100%

\*Facilities submitting inpatient claims to the Minnesota Hospital and Healthcare Partnership (MHHP) represent 97.1 percent of inpatient charges in Minnesota. Among hospitals submitting claims, only one hospital was not E-coding and one or two had a low percentage of E-Codes. Among all of the submitted claims, 79.1 percent of injuries were E-coded (MHHP, 2000).

\*\*Facilities submitting outpatient claims to MHHP represent 91.8 percent of outpatient charges in Minnesota. Among all of the submitted claims, 81.1 percent of injuries were E-coded (MHHP, 2000).

<sup>▲</sup> Gun-related injuries are tracked through Minnesota's voluntary E-Coding system. The data is aggregated by the Minnesota Hospital and Healthcare Partnership and analyzed by the Minnesota Department of Health. This system captures the majority of injuries, but there are undoubtedly more that are not reported. See the Appendix for more detail on E-Codes.



E-codes will include information on the type of gun used, if it is known and documented. In 1998, the type of gun was reported as unknown for 42 percent of the cases (see Table 2). Among cases for which the type of gun was reported, it was most often a handgun (37 percent of all cases, 65 percent of inpatient hospitalizations, and 21 percent of emergency department visits). Air guns accounted for almost as many cases as handguns (36 percent of all cases) and accounted for the majority of emergency department visits (55 percent of emergency department visits).

**E-Codes**

E-codes, or external causes of injury, classify the environmental events, circumstances, and conditions that cause an injury or poisoning. E-codes are based on the International Classification of Diseases, Ninth Revision, Clinical Modification system, or ICD-9-CM. E-codes also provide information on whether an injury was unintentional, intentional, or unspecified. E-codes are found on death certificates, thus, providing a surveillance system for fatal injuries. They are also coded on hospital billing forms, which provides a surveillance system for non-fatal injuries receiving medical treatment.

**Table 2. Type of Gun Used in Injuries by Site of Treatment, 1998 Minnesota**

	Inpatient*	Percent of Total	ED Visits**	Percent of Total	Total (nonfatal only)	Percent of Total
Handgun	67	35%	37	13%	104	22%
Shotgun	20	10%	19	6%	39	8%
Hunting Rifle	13	7%	23	8%	36	7%
Air Gun	3	2%	96	33%	99	21%
Unknown	89	46%	116	40%	205	42%
Total	192	100%	291	100%	483	100%

\*Facilities submitting inpatient claims to MHHP represent 97.1 percent of inpatient charges in Minnesota. Among hospitals submitting claims, only one hospital was not E-coding and one or two had a low percentage of E-Codes. Among all of the submitted claims, 79.1 percent of injuries were E-coded (MHHP, 2000).

\*\*Facilities submitting outpatient claims to MHHP represent 91.8 percent of outpatient charges in Minnesota. Among all of the submitted claims, 81.1 percent of injuries were E-coded (MHHP, 2000).

**BB, Pellet, and Air Gun Injuries**

Little data are available on BB, pellet, and air gun injuries; however, a study by the Centers for Disease Control and Prevention estimated that there were an average of 23,600 such injuries to children and teenagers per year between June 1992 and May 1994 (Centers for Disease Control and Prevention, 1995). Males, aged 10 – 14 years, had the highest rate of injury. Most of the injuries were unintentional and only 5 percent required hospitalization. An E-Code to capture air gun injuries was only recently created and national data is not yet available.

## COSTS OF GUN-RELATED INJURIES AND DEATHS

The economic burden of nonfatal gun-related injuries and deaths is significant.

### Hospital Cost Versus Hospital Charge

Cost: the expense incurred by a hospital while treating a patient

Charge: the amount due for services rendered

- In 1994, the average lifetime medical cost was \$17,000 per gun shot injury, \$2.3 billion for the nation (Cook, Lawrence, Ludwig, and Miller, 1999).
- When you add in mental health care, productivity losses and other direct costs, the cost of gunshot injuries in 1992 was an estimated \$40 billion (Miller and Cohen, 1997).

### Payment in the Midwest for Gun Shot Injuries

A 1997-98 study of a single Midwestern HMO used claims data to examine the costs of treating 63 gunshot injuries for the first three-months of treatment and follow-up care.

The average cost of care varied based on the setting where the initial care was delivered.

\$1,884	Outpatient/Ambulatory Care Setting
\$2,012	Emergency Department
\$11,189	Inpatient Hospitalization*

\*This average excludes the cost of care for one patient whose costs exceeded the costs of all of the other patients combined.

This is a preliminary study that included only 63 patients. (Brust and Carlson, unpublished data).

### Who Pays for Gun Injuries

- Nationally, in 1994, government sources paid for 49 percent of medical costs, private insurers paid for 18 percent of costs, and other sources paid for 33 percent of costs due to gun shot injuries. The "other sources" include self-pay patients, some of whom will never pay their bills, increasing the charges for other patients (Cook, Lawrence, Ludwig, and Miller, 1999).

## GUN OWNERSHIP AND THE RISK FOR INJURY

Gun ownership has been studied to determine if it is associated with a higher risk of death from suicide, homicide, or unintentional death. The protective benefits of gun ownership have also been examined. Research has found that the presence

of guns in the home and the community substantially increases the risk of injury and death to household and community members.

Although self-protection is often cited as a reason for gun ownership, guns are rarely used in self-defense (McDowall and Wiersema, 1994). Researchers estimate that there are 64,615 incidents of gun use for self-defense annually (McDowall and Wiersema, 1994). Fewer than two victims in one thousand use a gun in self-defense (McDowall and Wiersema, 1994). A study of 198 home invasion crimes found that a gun belonging to the victim was used in less than 4.5 percent of the cases (nine cases) (Kellermann, Westphal, Fischer, and Harvard, 1995). In six of the nine cases the intruder obtained the victim's gun. In three cases, the victim used their gun in self-defense.

Two studies have shown that guns in the home are far more likely to be used to harm household members through homicide, suicide, and unintentional shootings than to be used in self-defense (Kellermann and Reay, 1986; Kellermann, Somes, Rivara, Lee, and Banton, 1998). Homicide and suicide victims are three to five times more likely to have a gun in their home than comparable non-victims (Kellermann et al, 1993; Kellermann et al, 1992; Bailey et al, 1997; Brent et al, 1991). When only homicides committed by a family member or intimate acquaintance were studied, victims were even more likely (7 and 8 times as likely) than non-victims to have a gun in the home (Kellermann et al, 1993; Bailey et al, 1997).

It is less clear whether the method of gun storage affects the risk of death. One study of homicide and one study of suicide found that the risk for death was even greater if at least one gun was stored loaded or unlocked (Kellermann et al, 1993; Kellermann et al, 1992). A different study of adolescent suicides did not find that there was an increased risk of death when guns were stored loaded or unlocked (Brent et al, 1991).

Another way to assess the risk of gun-related death and injury is to determine if handgun purchasers have an increased risk of death or injury compared with non-purchasers. Two studies have found that handgun purchasers are at an increased risk of dying from suicide (Cummings, Koepsell, Grossman, Savarino, and Thompson, 1997; Wintermute, Parham, Beaumont, Wright, and Drake, 1999). Homicide was also higher among all handgun purchasers in the Cummings study, but Wintermute found that only women who purchased a handgun were at a significantly higher risk of homicide. Men who purchased a handgun during the study had a lower risk of dying from a homicide than the general population.

These men, however, also had a lower risk of dying from heart disease, cancer, or unintentional injury and the authors theorize that this is due to an "affluent-gun-buyer effect." The authors conclude that these men were not representative of the general population. Also, both of these studies did not take into account previous gun ownership. Many people who were part of the control group probably already owned guns, so that the risk of owning a gun was underestimated.

## **GUNS IN THE COMMUNITY AND THE RISK FOR INJURY**

Guns in the home increase the risk that household members will suffer from gun injuries and deaths. The presence of guns in the community in general has the same effect. A study that compared two similar cities, one with restrictive gun regulations (Vancouver, British Columbia) and one without (Seattle, Washington) found that, despite the fact that the overall rates of robberies, burglaries, and aggravated assaults were very similar, Seattle had a much higher homicide rate during the study period (Sloan et al, 1988). This was attributed to the much higher prevalence of gun ownership in Seattle compared with Vancouver (41 percent versus 12 percent respectively). The authors concluded that handgun control, if enacted, could significantly reduce national homicide rates.

When researchers compared the suicide rates in Seattle and Vancouver (Sloan et al, 1990) they found that the overall suicide rates were not different, but when the method of suicide was examined there were differences. Gun-related suicides were significantly higher in Seattle; however, this difference was offset by the use of other methods in Vancouver.

In Washington D.C, following handgun control enactment, gun-related homicides and suicides dropped by 25 percent and 23 percent respectively (Loftin, McDowall, and Wiersema, 1993; Loftin, McDowall, Wiersema, and Cottey, 1991). There were no significant declines in non gun-related homicides or suicides, and the surrounding areas did not show the same gun-related declines. These declines were still present eleven years after the handgun control was enacted.

Stricter handgun legislation was not associated with a decrease in suicide rates in Ontario according to Rich, Young, Fowler, Wagner, and Black (1990). When Carrington and Moyer (1994) examined the Ontario data over a longer time period they found that there was a drop in gun-related suicides immediately after the law. They also found no corresponding change in non-gun-related suicides, indicating that there was no method substitution.

## **GUN OWNERSHIP IN THE UNITED STATES**

Despite the risks of gun ownership, a significant proportion of American homes contain a gun. Guns are owned for hunting, target shooting, collecting, personal protection (Kellermann et al, 1995), and crime. Handguns are owned primarily for self-defense, while long guns are owned primarily for hunting and target shooting\* (Blendon, Young and Hemenway, 1996).

- Between 33 percent (Stennies, Ikeda, Leadbetter, Houston, and Sacks, 1999) and 41 percent (Blendon et al, 1996) of households in the United States own a gun; 35 percent of homes with children report at least one firearm (Schuster, Franke, Bastian, Sor, and Halfon, 2000).

\* see Appendix for more information on gun types

### **Gun Storage:**

- 21.5 percent of households keep at least one loaded and unlocked weapon in the home (Stennies et al, 1999).
- Homes with children are more likely to store all of their weapons unloaded and locked, but 9 percent (Schuster et al, 2000) to 11 percent (Stennies et al, 1999) have a loaded and unlocked weapon. An additional 4 percent of homes with children have a firearm stored unlocked and unloaded, but stored together with ammunition (Schuster et al, 2000).

## **GUN OWNERSHIP IN MINNESOTA**

- 48 percent of Minnesotans report keeping a gun in their home, slightly higher than the national average (Lewis, Erickson, Storkamp, and Weber, 1996).
- Sixty percent keep the gun for sporting purposes, 33 percent for both sporting and protection, and 6 percent mainly for protection (Lewis et al, 1996).
- A survey of Hennepin County residents found lower rates of gun ownership than the state average: 21.5 percent of Minneapolis residents and 36.4 percent of suburban Hennepin County residents reported a firearm in the home. About sixty percent of residents in both Minneapolis and suburban Hennepin County report that they keep the firearm stored in a locked place or stored with a trigger lock (Hennepin County Community Health Department and Minneapolis Department of Health and Family Support, 1998).
- Six percent of 12th grade males reported carrying a gun on school property at least once during the past 30 days (Minnesota Department of Children, Families and Learning Office of Community Services, 1999).

### **Minnesota State Law about gun storage:**

“Endangerment by firearm access. A person who intentionally or recklessly causes a child under 14 years of age to be placed in a situation likely to substantially harm the child’s physical health or cause the child’s death as a result of the child’s access to a loaded firearm is guilty of child endangerment...”  
(MN. STAT. ANN. Sec. 609.378 subd 1 (c) (supp. 2000))

**SUMMARY**

Gun-related deaths and injuries pose a significant threat to the health of Minnesotans. Older white males are at the highest risk of dying from gun-related suicides, and young black males are at the greatest risk of dying from gun-related homicides. Nonfatal gun-related injuries, especially unintentional injuries and assault-related injuries, also impact the health of many Minnesotans. These injuries are expensive and preventable. Some of the risk factors, which could be modified, have already been identified and include having a gun in the home.

## PART II

# The Strategies

*What the Experts Said*

*Research Review*

## WHAT THE EXPERTS SAID

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Interviews with 18 experts in gun-related injuries and deaths revealed a number of promising strategies that the health care industry could implement or influence in an effort to reduce gun-related injuries and deaths. Although some strategies were cited more frequently than others, many of the experts envisioned a multi-faceted approach. The most widely cited strategies are listed below.

<b>Recommended Strategies</b>	
<b>Provider Training</b>	= 5 Respondents
<b>Gun Safety Counseling</b>	= 13 Respondents
<b>Data Collection</b>	= 11 Respondents
<b>Advocacy</b>	= 11 Respondents

(Respondents were allowed to select more than one strategy.)

### **Provider Training**

The strategy most frequently mentioned by the experts involved providing patients with gun safety counseling about gun ownership, use, and storage. Clinicians need to be trained in order to be effective and feel comfortable counseling patients. Training could occur through medical school, nursing programs, professional organizations, or continuing education. The review of the literature provides more detail on current provider training and barriers to training on gun safety counseling.

### **Gun Safety Counseling**

The most widely recommended strategy by experts was that health care providers offer gun-safety counseling to patients. Health care provider organizations<sup>▲</sup> also support and promote gun safety counseling as part of patient care.

Experts identified two methods for providing gun safety counseling:

- general gun safety counseling delivered to all patients during general office visits
- more targeted, intensive gun safety counseling provided to individuals who are at particularly high risk due to a number of identified risk factors (i.e., known to be suicidal, known to be in an abusive relationship, etc.)

### **Data Collection**

The third strategy identified by the gun injury experts involved the need for additional data collection. Data are needed to identify the true magnitude of the

<sup>▲</sup> The American Medical Association, American College of Physicians-American Society of Internal Medicine, the American Academy of Child and Adolescent Psychiatry, and the American Academy of Pediatrics (Brown and Goldman, 1998; American College of Physicians, 1998; American Academy of Child and Adolescent Psychiatry, 1997; American Academy of Pediatrics Committee on Adolescents, 1992; American Academy of Pediatrics Committee on Injury and Poison Prevention, 1992).



problem, the costs of gun injuries and deaths, and risk factors. In particular, improvements in data collection are needed for non-fatal gun-related injuries, the relationship between alcohol and drugs and gun-related injuries, and the types of guns involved in injuries. Understanding risk factors for gun-related injuries and deaths would improve the health care provider's ability to identify and counsel high-risk patients. Data are also needed to inform public policy and to evaluate the effectiveness of strategies.

Opportunities to maximize the use of local gun-related data exist. Law enforcement, emergency medical services, and hospitals all collect data on gun-related injuries; linking their data sets would increase our understanding of the problem and the risk factors.

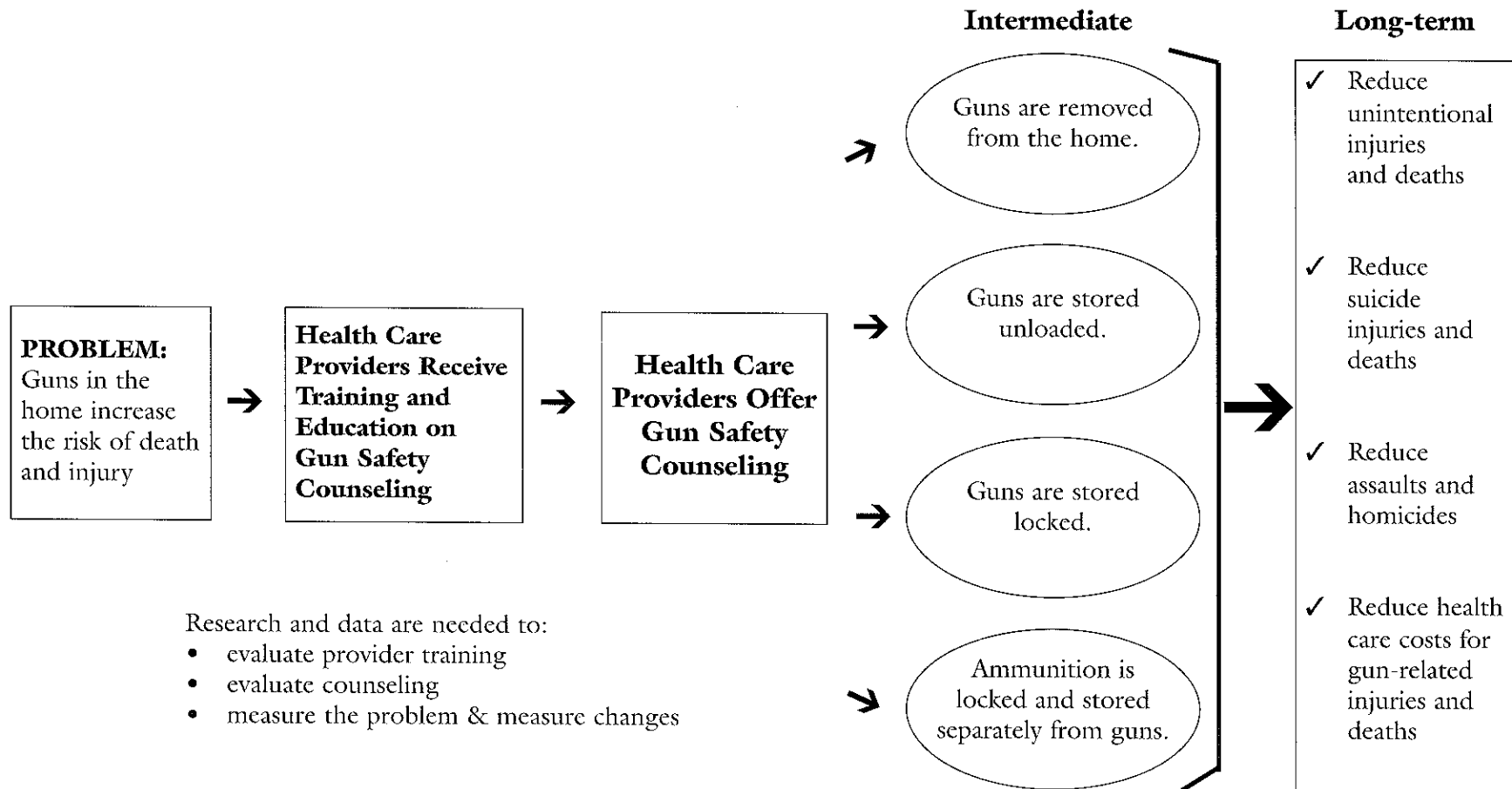
### **Advocacy**

The fourth strategy identified by the gun injury experts involved advocacy by individual health care providers and health care systems to change policies and laws related to guns. Advocacy is a particularly effective and important strategy because physicians are seen as highly credible spokespersons by the general public. This strategy is also widely supported by health care provider organizations.<sup>▲</sup>

<sup>▲</sup> The American Medical Association, American College of Physicians—American Society of Internal Medicine, and the American Academy of Pediatrics (Brown and Goldman, 1998; American College of Physicians, 1998; American Academy of Pediatrics Committee on Adolescents, 1992).

## Gun Violence Counseling Conceptual Framework

This framework depicts how gun violence counseling by healthcare providers could be used to reduce gun injuries and deaths. It also explains where more data and research are needed to study the issue.



## RESEARCH REVIEW

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### PROVIDER TRAINING

*“I wonder if residency directors would have the same reaction to talking about a known organism that ravaged our children and youth as firearms do . . . or if they’d throw up their arms and cry defeat rather than encourage finding effective interventions.”*

—Catherine D. DeAngelis, MD, 1997

One of the two largest barriers identified by physicians<sup>▲</sup> to offering gun safety counseling is that they do not know what to tell parents (Webster et al, 1992). This is not surprising considering the availability of training.

#### Status of Training

- 78% of physicians report that they lack training regarding gun safety counseling (Everett et al, 1997).
- The majority of physicians are interested in receiving training (Cassel, et al 1998; Olson et al, 1997).
- Only one third of the pediatric residency programs surveyed offer this training (Price, Conley, and Oden, 1997).
- 16 percent of family practice residency programs surveyed offer gun safety counseling training (Price, Bedell, Everett, and Oden, 1997).

#### **American College of Physicians Position**

(American College of Physicians, 1998)

- Internists should be involved in firearm injury prevention within the medical field and as part of the larger community.
- Internists should discuss the dangers of firearm ownership and having a gun in the home with their patients.
- Physicians should obtain training on firearms injury prevention, including education about adolescent assault, homicide, and suicide.
- Physicians should support community efforts to enact legislation restricting the possession and sale of firearms.
- The College must take an active role in providing education and training for internists on all aspects of violence prevention, including firearm injury prevention.

<sup>▲</sup> No relevant research was found for this section on other health care providers.

### **Barriers to Offering Training**

- There is a lack of trained personnel, educational resources, and time, and there are many other competing issues (Price, Conley, and Oden, 1997).
- The vast majority of residency program directors do not believe that this type of counseling would be effective (Price, Conley, and Oden 1997; Price, Bedell, Everett, and Oden 1997).

### **Importance of Training**

Receiving training in violence prevention, whether in medical school, residency, fellowship, or continuing medical education increases the likelihood of pediatricians providing violence prevention counseling (Borowsky and Ireland, 1999).

### **Elements of Training**

Provider training on gun safety counseling should include practicing screening questions on gun ownership and storage, basic information about the dangers of guns, gun storage, gun safety, and alternatives to gun ownership, and information on how to respond to violence-related injuries.

The experts interviewed identified the following key components of gun safety counseling:

- ask whether or not there is a gun in the home
- advise of dangers associated with gun ownership
- ask how gun is stored
- advise on how to either store guns correctly or remove guns
- explain to children what to do if they see a gun
- display flyers, posters, and videos in the lobby that reinforce the message to remove or safely store guns

The American Medical Association has a primer on guns and gun safety counseling available for physicians to learn more about the topic (Brown and Goldman, 1998).

#### **Recommendations for Providers**

- Attend training on gun safety counseling.
- Encourage other providers to obtain training on gun safety counseling.
- Offer training on gun safety counseling.

#### **Recommendations for Hospitals/Health Care Systems**

- Require providers to obtain training on gun safety counseling.
- Offer providers training on gun safety counseling or pay providers to attend.

## GUN SAFETY COUNSELING

*“Children who play with fire will get burned, and those who play with firearms will get shot or shoot others. So why does there seem to be such a difference in our beliefs and activities for preventing both?”*

— Catherine D. DeAngelis, MD, 1995

Of 16 gun safety counseling research articles reviewed, only three assessed interventions and the remaining thirteen focused on the knowledge, beliefs, attitudes, and behaviors of clinicians, parents, and patients in relation to gun safety counseling.

### Clinicians' Beliefs

- The majority of pediatricians, internists, and surgeons believe that physicians have a responsibility to provide gun safety counseling (Cassel et al, 1998; Grossman, Mang and Rivara, 1995; Webster, Wilson, Duggan and Pakula, 1992).
- Family practice physicians are significantly less likely than pediatricians to believe that physicians have a responsibility to provide gun safety counseling (Grossman et al, 1995).
- The belief that their counseling is effective ranges from 38 percent to 82 percent for health care providers (pediatricians, family practice physicians, and nurse practitioners) [Barkin, Duan, Fink, Brook and Gelberg, 1998; Olson, Christoffel and O'Connor, 1997].

Studies that surveyed physicians regarding specific safety strategies found that:

- Physicians are more comfortable counseling for safe storage than removal of guns (Grossman et al, 1995; Olson et al, 1997; Webster et al, 1992).
- 95 to 97 percent of physicians support asking parents to unload and lock guns stored in the home (Grossman et al, 1995; Olson et al, 1997) while only 66 percent support encouraging parents to remove handguns (Olson et al, 1997).

### Clinicians' Barriers

The two largest barriers to gun safety counseling for physicians are lack of time during patient visits and uncertainty about what to tell patients (Barkin et al, 1998; Everett, Price, Bedell and Telljohann, 1997; Grossman et al, 1995; Webster et al, 1992). Additional barriers identified in one study were the belief that parents would not follow advice if given (25 percent) and the belief that gun injuries and fatalities are not a problem in their patient population (24 percent) (Everett et al, 1997).

A potentially important issue is lack of understanding of the seriousness of the problem.

## A REVIEW OF THE RESEARCH ON GUN INJURIES

- In one study, 50 percent of pediatricians believed that children under 10 are at greater risk of dying from poisoning than a gun shot when in actuality they are 2.5 times more likely to be killed by a gun (Webster et al, 1992).
- Another study of pediatricians found that 51 percent of the pediatricians owned a gun (handgun or long gun), 34 percent owned a handgun, and 11 percent kept a loaded gun in the home or car (Fargason and Johnston, 1995).

### **Clinicians' Behaviors**

Although most pediatricians, internists, and surgeons endorsed gun safety counseling, few incorporate it into their practices. Of those that do, only a small percentage of their patients or patients' families received it.

- 1 percent of physicians report always counseling their patients on gun safety (Everett et al, 1997).
- 1.7 to 32 percent of physicians report that they counsel a significant portion of their patients on gun safety (Barkin et al, 1998; Cassel et al, 1998; Everett et al, 1997; Grossman et al, 1995; Webster et al, 1992).
- 30 to 58 percent of physicians report ever having counseled a patient on gun safety (Kaplan, Adamek and Rhoades, 1998; Webster et al, 1992).
- 48 to 52 percent of physicians report that they never counsel patients on gun safety (Everett et al, 1997; Grossman et al, 1995).

### **Parents' Experiences**

Three studies evaluated parent's experiences, knowledge, attitudes, and barriers regarding guns and gun safety counseling.

- Gun ownership among these parents ranged from 20 percent to 48 percent (Haught, Grossman and Connell, 1995; Knight-Bohnhoff and Harris, 1998; Webster, Wilson, Duggan and Pakula, 1992).
- Very few of the parents report having received gun safety counseling from a health care provider (Haught et al, 1995; Knight-Bohnhoff and Harris, 1998).
- 10 percent report keeping a gun loaded and unlocked in their home (Haught et al, 1995).

### **Parents' Knowledge**

Each study found that significant percentages of parents owned guns and did not store their guns in a manner consistent with the recommendations of the American Academy of Pediatrics.

### **Recommendations from the American Academy of Pediatrics**

(as cited in Knight-Bohnhoff and Harris, 1998):

- remove guns from the home
- store guns unloaded and locked
- store ammunition away from guns in a locked area

- When gun owners were asked to identify strategies that would keep their children from being injured by their gun, more than half did not identify a single one of the strategies recommended by the American Academy of Pediatrics (Knight-Bohnhoff and Harris, 1998).
- Gun owners are more likely to use education and discipline to prevent gun injuries and deaths than to remove the gun (Knight-Bohnhoff and Harris, 1998; Webster et al, 1992).
- 46 percent of gun owners versus 10 percent of non-owners believed children 6 or younger can distinguish a real gun from a toy gun (Webster et al, 1992).

### **Parents' Attitudes**

Parents of pediatric patients are receptive to receiving gun safety counseling from their providers (Haught et al, 1995).

- 75 percent of parents would follow the advice of their clinician regarding safe storage (Webster et al, 1992).
- 17 percent (Webster et al, 1992) to 47 percent (Haught et al, 1995) of parents said they would follow their clinician's advice to not keep a gun in the home.
- 52 percent of gun owners reported they would be willing to pay a higher price for a gun with a safety mechanism (Knight-Bohnhoff and Harris, 1998).

### **Parents' Barriers**

Examining parents' barriers to removing or storing their gun safely may help health care providers counsel more effectively. Parents who stated that they would be unlikely to comply with their pediatrician's advice regarding gun safety gave the following reasons (Webster et al, 1992):

- parent possesses superior knowledge about gun safety compared with the physician;
- parent does not consider their family to be at risk;
- parent believes that the safety of their home is increased with the presence of a gun;

- parent believes gun ownership is a private decision; and
- parent believes their spouse would be opposed.

### **Patients' Beliefs**

Only two studies collected data from adult patients regarding gun safety counseling and the findings are conflicting. The first study (Price, Clause, and Everett, 1995) found:

- 56 percent of patients felt that physicians should discuss gun safety issues with patients.
- 65 percent believed that clinicians could alter public opinion about guns by providing gun safety counseling to patients.
- Only 38 percent believed that physician counseling could change their beliefs about gun ownership and 31 percent believed it could change their beliefs about gun storage.

In contrast, the second study (Shaughnessy, Cincotta, and Adelman, 1999) found:

- 92 percent of patients disagreed with the statement "my doctor has a responsibility to talk to me about firearm safety".
- 9 percent selected doctors as a source of information regarding gun injury prevention and 14 percent thought doctors were knowledgeable about gun safety.
- Overall, 40 percent agreed that "I'm likely to follow my doctor's advice about storing guns," but among gun owners only 29 percent agreed and among non-owners 47 percent agreed.

### **Gun Safety Counseling Interventions**

Three research studies examined the effectiveness of gun safety counseling. Kruesi (1999) examined the effectiveness of training emergency department staff to educate parents on restricting access to lethal means for suicide. Staff were trained to educate parents whose children came into the emergency department for mental health assessment or treatment. Education by staff increased, but was still only received by 40 percent of parents. Those parents, however, were 3.6 times more likely to restrict access to guns and other means of committing suicide than parents who did not receive the education. Parents were more likely to lock up guns and other lethal means than to remove them from the home.

In the second counseling intervention study, patients' responses to a physician counseling about guns and homicides was evaluated immediately following the visit (May and Martin, 1993). The physician was trained to discuss six different preventive medicine topics. Patients remembered the gun discussion more than any other topic. Just over a third of the patients reported that it was the most



important topic discussed. Over 80 percent of the patients said that it is important for a doctor to talk about gun safety and 94 percent said that something the doctor said would change the way they try to take care of themselves. There was no long-term follow up with the patients in this study.

The American Academy of Pediatrics Steps to Prevent Firearm Injury (STOP) educational intervention was implemented in hospital-based, urban, low-income pediatric clinic in a Midwestern city (Oatis, Buderer, Cummings and Fleitz, 1999). Education regarding the dangers of guns was provided and staff recommended that families remove guns or store them unloaded and locked. The clinic also displayed STOP brochures, handouts, and posters. At an eleven month follow-up there were slight decreases in gun ownership, handgun ownership, long gun ownership and the practice of keeping a gun in the home loaded; however, none of the decreases were statistically significant. It is unclear whether the lack of significance in the reduction of gun ownership is due to the ineffectiveness of the curriculum, the delivery method, or whether the study did not include enough patients to adequately assess the curriculum.

### **Recommendations for Providers**

- Screen every patient for gun ownership.
- Recommend to every patient that guns not be kept in the home and, if they are, that they be stored unloaded and locked.
- Participate in a study to determine the effectiveness of physician counseling.
- Help patients identify other means of self-protection and home safety.

### **Recommendations for Hospitals/HealthCare Systems**

- Require providers to screen and educate patients about gun ownership.
- Provide screening and educational tools.
- Include screening for guns and gun safety counseling in standard patient care protocol and incorporate gun screening into medical forms (i.e., medical history form or standard Health Risk Assessments).
- Consider lengthening patient visits to allow adequate time for recommended screenings.

## DATA COLLECTION

*“The published literature is more noteworthy for what it does not show than for what it does. There is, it appears, scarcely a single finding in the literature that could be said to have been indisputably established. In part, this reflects the highly politicized nature of research in this area, but perhaps more importantly, it results from a near-total absence of sound and nationally generalizable data from which reliable information about weapons, crime, and violence might be extracted.”*

—Teret, Wintermute, and Beilenson, 1992

In public health, data are used to understand the magnitude and nature of problems and to develop and evaluate interventions. A systematic, national data collection system for gun-related events does not exist. Currently, there are multiple data collection efforts around the country, however, without standardized definitions and data collection procedures those data cannot be compared, aggregated, or analyzed (Mercy, Ikeda and Powell, 1998). Linking data sets can be expensive and labor intensive (Koo and Birkhead, 1998; Kellermann and Bartolomeos, 1998) and presents unique challenges for public health professionals because law enforcement agencies, who are not typical partners, collect much of the data surrounding gun injuries (Frattaroli and Teret, 1998).

### **Need For Data to Conduct Gun-Related Injury Surveillance**

Data are needed to:

- understand the magnitude and the nature of the problem (Saltzman and Ikeda, 1998; Mercy et al, 1998)
- follow trends and to develop and evaluate the effects of public health policy (Saltzman and Ikeda, 1998; Mercy et al, 1998)
- plan, implement, and evaluate public health programs (Mercy et al, 1998)

### **Limitations in Current Data Collection Efforts**

Current surveillance efforts have a number of limitations, which include:

- lack of information on gun-related morbidity (Mercy et al, 1998)
- lack of information about gun-related physical disabilities (Annest and Mercy, 1998; Mercy et al, 1998)
- lag time of about 2 years between the collection and availability of gun-related mortality data at the national level (Mercy et al, 1998)
- lack of coordination and integration between the federal agencies collecting gun injury and death data (Annest and Mercy, 1998)

- lack of the following key data elements in existing data sources:
  - type, make, model, caliber, and serial number of the gun involved (Koo and Birkhead, 1998; Mercy et al, 1998; Teret, Wintemute and Beilenson, 1992)
  - location of bullet entry (Saltzman and Ikeda, 1998)
  - date, time, and location of gun-related injury incidents (Koo and Birkhead, 1998; Mercy et al, 1998; Teret et al, 1992)
  - the involvement and extent of emergency medical services (Koo and Birkhead, 1998; Teret et al, 1992)
  - whether the gun-related injury occurred during a criminal act (Annest and Mercy, 1998; Koo and Birkhead, 1998; Teret et al, 1992)
  - long-term outcome of gun-related injury (Saltzman and Ikeda, 1998)
  - drug or alcohol use of victim and assailant prior to and during the incident (Koo and Birkhead, 1998; Mercy et al, 1998; Teret et al, 1992)
  - educational level of both victim and assailant (Saltzman and Ikeda, 1998)
  - the residence of the assailant (Saltzman and Ikeda, 1998)
  - the relationship of the victim to the assailant (Annest and Mercy, 1998; Koo and Birkhead, 1998; Mercy et al, 1998; Teret et al, 1992)
  - location of incident (Annest and Mercy, 1998)
  - risk/protective behaviors of the victim (i.e., bullet proof vest)(Mercy et al, 1998)

### **Nonfatal Injury Data Limitations in Minnesota**

E-codes are used to track nonfatal injuries and are assigned based on the information written in medical charts. E-code data are limited by:

- the percentage of hospitals submitting claims data
- the percentage of hospital claims that are E-coded (80 to 85 percent in Minnesota)
- physician charting
  - Medical coders use physician documentation to assign the E-code. If physicians do not document, document inaccurately, or document inadequately, it affects the E-code assigned.
  - E-codes enable identification of an injury caused by an assault; they can also enable identification of the type of gun used (handgun versus long gun), if that information is documented in the chart.

### **Key Data Sources**

The following data sources were identified as useful in compiling the desired data elements (Saltzman and Ikeda, 1998):

- vital statistics
- medical examiner records
- coroner reports
- police department records
- emergency department medical records
- hospital medical records
- ballistics laboratory reports

### **Problems with Combining Different Data Sources**

Although the necessary data elements exist within the records of a number of different agencies, compiling this information is a challenge. Some of the barriers are as follows (Koo and Birkhead, 1998):

- Many data sources are not computerized. Utilizing these records requires extracting the needed data elements by hand from charts and records.
- Databases are often not compatible, requiring data extraction and data entry before analysis is possible.
- The quality and the validity of data elements from different sources may vary.

#### **Recommendations for Providers**

- Document patient injuries as accurately and completely as possible.

#### **Recommendations for Hospitals/Health Care Systems**

- Report claims data to the Minnesota Hospital and Healthcare Partnership.
- Share data for the development of surveillance systems.
- Expand capacity for E-coding to include clinics when feasible.

## ADVOCACY

*“One can be anti-gun injuries and not be anti-gun.  
There’s a safe and sane and reasonable middle there  
that people forget about”*

—Arthur L. Kellermann, MD, MPH  
(as cited in Lerner, 1996)

### Health Care Professionals Role in Advocacy

Health care professionals, especially pediatricians, have a unique role to play in developing and advocating for gun-related policies. They are highly respected experts in child development and health and can frame the debate as a child-safety issue (Dolins and Christoffel, 1994). Keeping the debate focused on children’s health makes it less politically controversial (Dolins and Christoffel, 1994).

### Advocacy Agenda

There are many potential policy strategies for regulating guns. Barriers to developing an advocacy agenda include: it is difficult to measure the effectiveness of gun-related policies, there is little existing research in this area, and much of the existing research has been enmeshed in politics. Presented below is a framework that was developed by Teret and Wintermute (1993) to describe the possible methods of gun regulation. Seven categories of regulation are described and examples of the type of regulation that would fall into that category are presented.

### Types and Examples of Gun Policies (adapted from Teret and Wintermute, 1993)

1. Policies related to the manufacture of guns
  - Ban the manufacture of guns
    - All guns
    - Certain guns
    - All handguns
  - Regulate the manufacture of guns
    - Product design, safety regulations
  - Tax manufacturers for each gun produced
2. Policies related to the sale of guns
  - Ban the sale of guns
    - All guns
    - Certain guns
  - Ban the sale of guns to certain people
  - Limit the number of guns that can be sold to a person within a given time period
3. Regulate the marketing and advertising of guns by manufacturers and sellers
  - Prohibit some venues of advertising (for example, television)
  - Regulate the content of advertising

4. Policies related to the possession of guns
  - Ban possession
  - Register possession
    - Register all guns
    - Register certain guns
    - Increase registration fees
  - Restrict possession
5. Policies related to the use of guns
  - Ban the discharge of guns
  - Mandatory jail for crimes using guns
6. Policies related to the regulation of importation of guns
7. Policies related to the regulation of ammunition (manufacture, sale, and possession)

Policies that regulate the manufacture, marketing, and sale of guns are most likely to be effective, whereas policies that regulate use are least likely to be effective in reducing gun injuries and deaths (Christoffel, 1991; Teret and Wintermute, 1993). When evaluating the potential effectiveness of a strategy, a key factor is whether or not it requires a person to change their behavior, particularly if they are required to repeat a task over and over (such as unloading and locking). These strategies are least likely to be effective (Christoffel, 1991; Teret and Wintermute, 1993). Historically, injury prevention efforts have been most successful when changes are made to the environment or the product and do not require a change in the user's behavior (Christoffel, 1991; Teret and Wintermute, 1993).

Gun regulation can occur at any level of government. Local laws are usually easier to implement, but may not be as effective as state or national laws. Most consumer products are regulated at the federal level by the Consumer Product Safety Commission (CPSC); however, the CPSC can only regulate nonpowder guns such as air guns and BB guns (Christoffel, 1991; Teret and Wintermute, 1993). Although the Bureau of Alcohol, Tobacco and Firearms has regulatory authority over the design and production of guns, they are not actively working towards increasing gun safety (Teret and Wintermute, 1993).

### **Minnesota Advocacy Agenda**

The following advocacy agenda from Citizens for a Safer Minnesota provides an overview of potential laws to advocate for in Minnesota at the state level. One important consideration for advocacy in Minnesota is that Minnesota is a pre-emption state. Pre-emption states do not allow stricter gun control at the local level than exists at the state level.

**2000 Advocacy Agenda for Minnesota** (Citizens for a Safer Minnesota)

Protect Children

- a. mandate child safety locks on all handguns sold
- b. increase the age of handgun possession/purchase to 21
- c. require proof of insurance when purchasing a handgun
- d. tighten the current law holding parents responsible when a child misuses an improperly stored gun

Keep guns from criminals/gang members

- a. close loopholes in our current background check law
- b. require background checks on private handgun transfers
- c. regulate sales at gun shows
- d. limit handgun purchases to one per month (anti-trafficking)
- e. license handgun owners
- f. register handguns
- g. repeal current state law that pre-empts local governments from enacting their own gun regulation

Assure product safety

- a. set minimum safety standards on all handguns sold in Minnesota
- b. modernize the ban, currently in state law, on sale and possession of cheap Saturday Night Specials

Don't weaken current law

- a. oppose weakening of Minnesota's concealed carry permit system
- b. oppose special protection for gun stores or shooting ranges
- c. oppose immunity for gun dealers from liability suits

**Opportunities for Health Care Providers to Be Involved**

There is a great deal that health care providers can do to delineate the risks of guns from a health perspective such as:

- write letters to the editor of newspapers and journals
- participate in interviews (i.e., with the media, when events occur, etc.)
- lecture in public forums
- participate on task forces
- provide testimony in legislative hearings
- assist with designing mass media campaigns or act as a spokesperson
- partner with other gun safety organizations and gun manufacturers to advocate for safer gun designs
- lobby legislators using current research findings and anecdotal experiences
- work with victims of gun violence.

There are resources at both the national and local level to help health care providers identify these opportunities and stay informed about the issues. Nationally, the American Academy of Pediatrics prepares policy statements and recommendations for advocacy efforts (Dolins and Christoffel, 1994). Another source of information specifically designed for health care professionals is HELP (Handgun Epidemic Lowering Plan), an association of medical and allied

organizations working to reduce handgun violence (www.helpnetwork.org). They serve as an information clearinghouse and host conferences for professionals working to reduce handgun injuries and deaths.

At the state level health care provider organizations (i.e., Minnesota Medical Association, Minnesota Nurses Association and Minnesota Public Health Association) have the ability to be active and advocate on this issue. Members of these organizations can influence their advocacy agenda and efforts. There are other local efforts, which welcome members and can provide individuals with a lobbying presence at the state level. Two currently active organizations are: Citizens for a Safer Minnesota and Stop Gun Injuries and Deaths Coalition.▲

## Gun Regulation and the Second Amendment

**Second Amendment:** A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.

*"Although advocates may debate the meaning that should be given to the Second Amendment, under the American legal system the meaning of any particular constitutional provision is determined by the controlling precedent of Supreme Court cases."*

—Vernick and Teret, 1993

Two Supreme Court decisions have guided future court rulings on the Second Amendment (Vernick and Teret, 1993). In 1886, the Supreme Court ruled for the state of Illinois in *Presser v Illinois*, finding that the Second Amendment only applies to Congress and not to state governments. In 1938, the National Firearms Act was challenged in *United States v Miller*. The Supreme Court upheld the National Firearms Act finding that the Second Amendment does not guarantee the individual right to keep and bear arms unless there is "some reasonable relationship to the preservation or efficiency of a well regulated militia" (Vernick and Teret, 1993). The lower courts have consistently upheld these decisions (Vernick and Teret, 1993).

The result of these rulings is that the Second Amendment does not apply to state law and at the federal level, only prohibits laws that would interfere with state militias (Vernick and Teret, 1993).

## Recommendations for Providers

- Educate the public by writing letters to the editor, speaking to the media, testifying at the legislature, or participating in a community campaign.
- Participate in advocacy efforts through state or national organizations.
- Promote policies within health care organizations that support the prevention of gun-related injuries and deaths.

## Recommendations for Hospitals/Health Care Systems

- Use lobbyists to influence gun related legislation.
- Implement policies within health care organizations that promote the prevention of gun-related injuries and deaths.

▲ See Appendix for more information on these organizations.



## OTHER INTERVENTIONS

This review focuses only on the four strategies that were most widely mentioned in the expert interviews. There are other interventions that health care providers could be involved in. Community-based interventions can be centered around health care facilities or involve health care professionals as educators or spokespersons. A review of the research literature revealed published studies on only three such interventions. The interventions and study methodologies varied too much to draw any general conclusions. The committee is also aware that health care providers or facilities have tried exposing high-risk youth to the results of violence by bringing them into the emergency department. No published studies describing or evaluating this type of intervention were located.

## PART III

# Conclusions

*Recommendations for Future  
Research*

*Summary*

## RECOMMENDATIONS FOR FUTURE RESEARCH

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A careful review of the literature revealed that there is little existing research on health care strategies and their role and effectiveness in preventing gun-related injuries and deaths. There is also a need for data to better assess and understand gun-related injuries and deaths. All gun violence prevention projects should have a strong evaluation component. The following are ideas for research that if completed, would lead to a better understanding and application of the strategies recommended in this review.

### **Training Health Care Providers to Offer Gun Safety Counseling:**

- Does training health care providers on how to counsel about gun safety increase their screening and counseling activities?
- What type of training is most effective for health care providers?

### **Gun Safety Counseling:**

- Is gun safety counseling effective at getting patients to remove or lock up their guns and ammunition? What increases effectiveness?
- Does the risk for gun injuries or deaths decrease after a gun is removed from the home?
- Does the risk for gun injuries or deaths decrease when guns are locked and stored separately from ammunition?
- Who should receive gun safety counseling? Is it more effective to offer counseling to all patients (universal) or to target patients, such as those with depression, a history of mental illness, or adolescents?
- Is it effective to counsel the spouse of the gun owner or do gun owners, themselves, need to receive the counseling for it to be effective? Is it effective to counsel spouses on how to talk to their partner about removing or locking up a gun?
- Who should deliver gun safety counseling? Counseling could be offered by all physicians, nurses, other health care professionals, or providers in certain specialties such as pediatrics.
- What does gun safety counseling cost and what are the savings?

### **Data Collection:**

- Expand the cost study that used one Midwestern health plan to examine the full range of costs for treating gun shot injuries.
- Continue to improve the quality of E-Code data.
- Increase the application and usage of E-Code data throughout Minnesota.
- Expand E-coding to include outpatient visits.
- Collect data on BB gun, pellet gun, and air gun injuries.
- Link data sets across law enforcement and health care.

## SUMMARY

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Both gun related and motor vehicle injuries are preventable (Rosenberg and Hammond, 1998). Over the past three decades, motor vehicle deaths have declined in the United States because there has been a scientific, comprehensive, and multi-disciplinary approach to reducing the risks for these injuries (Bonnie, Fulco and Liverman, 1999; Kellermann, Lee, Mercy, and Banton, 1991; Mercy, Rosenberg, Powell, Broome, and Roper, 1993). This has not happened with gun injuries to date primarily because strategies that would reduce deaths and injuries from guns have been obscured by politics (Bonnie et al, 1999; Kellermann et al, 1991; Mercy et al, 1993).

*“In the committee’s view, a workable consensus is most likely to emerge if the discussion is focused less on ownership issues and more on the steps that can be taken to reduce the adverse health consequences of firearms use and to strengthen the scientific basis of policy making.”*

—Bonnie, Fulco, and Liverman, 1999  
Committee on Injury Prevention and Control  
Institute of Medicine

Health care providers are uniquely positioned to address the issues of gun-related injuries and deaths as a health issue. This can be done on an individual or policy basis. More data and interventions with an evaluation component are needed to determine the most effective strategies to prevent gun-related injuries and deaths. Health care providers, however, should not wait until research has conclusively demonstrated best practices. Providers should act on existing research and expert opinion, and counsel families to remove guns from their home or store them unloaded and locked. Health care organizations should implement policies that support this strategy.

## **APPENDICES**

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**METHODOLOGY**

**GUN INJURY EXPERTS**

**GUN TYPES**

**E-CODES FOR GUN RELATED INJURIES**

**RESOURCES**

**EVIDENCE TABLES**

**REFERENCES**

**HISTORY OF THE HEALTH CARE COALITION ON  
VIOLENCE**

## METHODOLOGY

### **Methodology: Expert Opinion**

To learn “what works” in preventing gun injuries, the Health Care Coalition on Violence’s Data and Research Committee members interviewed gun injury experts and reviewed the relevant data and research on gun injuries related to prevention strategies. Initially, the Data and Research Committee identified twelve gun injury experts at the national and local level, including researchers, physicians, and community leaders. The remaining experts were identified through a snowball technique, whereby the initial list of experts recommended additional experts. In all, 18 experts were interviewed. Experts were interviewed over the telephone by committee members using a standardized interview protocol. Experts were asked to identify prevention strategies the health care sector could implement that would reduce gun injuries. After the initial interviews were completed, experts were contacted a second time and asked to rank the importance of each of the strategies suggested.

Strategies recommended by the experts were grouped into major topics. Research literature addressing these topics was reviewed by committee members and a summary of the findings was compiled. The quality of the research studies was not assessed as a part of this review.

### **Methodology: Literature Review**

Research articles reviewed for this report were located through the MEDLINE database, from 1985 to present. The literature search involved a combined search using two or more of the following keywords: firearm, gun, health care, physician, hospital, counseling, data, referral, advocacy, and training. These keywords were obtained from the expert interviews and encompassed key recommended strategies. The bibliographies of research articles were also reviewed for additional pertinent articles. In addition, gun experts were solicited for key articles. Lastly, the compiled bibliography was examined by HCCV’s Data and Research Committee for completeness. Although the bibliography may not be exhaustive, the Committee believes it captures the key articles.

Only published research articles were included in this report. Editorials were not included. Evidence tables included in the Appendix of this report contain key information on the research studies. Research studies included in the evidence tables were read and abstracted by at least one reviewer from the committee. Finally, this report and its findings were reviewed by gun injury and public health experts for thoroughness and accuracy.

## A REVIEW OF THE RESEARCH ON GUN INJURIES

### GUN INJURY EXPERTS CONSULTED

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Department of Emergency Medicine  
Residency Program  
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Professor of Pediatrics and Preventive  
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Duke University  
Durham, North Carolina

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Children's Safety Network  
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Director of Trauma Services  
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St. Paul, Minnesota

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Johns Hopkins School of Public Health  
Baltimore, Maryland

Garen Wintemute, MD  
Violence Prevention Research Program  
University of California-Davis  
Davis, California

## GUN TYPES

Personal guns can generally be classified into two major groups: handguns and long guns. These classes refer to the relative length of the weapon's barrel. In general, guns with a longer barrel are more powerful and accurate. A shorter barrel allows a gun to be more easily concealed and transported.

Rifles, which fire single projectiles, and shotguns, which fire hundreds of small pellets per shot, are examples of long guns. Long guns are designed to be fired from the shoulder and are used mostly for hunting and sporting purposes. Handguns are smaller and do not need to be fired from the shoulder. Pistols and revolvers, two types of handguns, were initially designed for defensive purposes (Karlson and Hargarten, 1997).

The loading and firing operations of all guns fall into three broad categories: manual, semi-automatic, and fully-automatic. The type of loading and firing action a gun has determines its rate of fire, or how many rounds per minute it can shoot. A semiautomatic weapon can fire thirty to sixty rounds per minute, while a fully automatic rifle can fire six hundred rounds per minute (Karlson and Hargarten, 1997).

- Manual weapons require the operator to manipulate the weapon between each shot to ready it for the next firing. The operator must place the next round into position using a lever, slide, or bolt, or in the case of a single action weapon the operator must actually load another round. Pulling the trigger causes the gun to fire only one shot.
- Semiautomatic weapons are like manual guns in that pulling the trigger only fires one shot, but the loading mechanism is automatic so that the next cartridge is automatically put into place for firing.
- Automatic weapons require only one sustained pull on the trigger to cause successive rounds to be fired.



## E-CODES FOR GUNS

In 1996, E-coding was used on about 40 percent of the metro area inpatient claims (no data were available for out-state). However, by July 1999, an estimated 80 to 85 percent of the inpatient and outpatient claims statewide were E-coded. The HCCV Data subcommittee helped increase usage of E-codes statewide by communicating the need for E-codes through publication and presentations and identifying solutions to barriers that limited usage.

### The Data and Research Committee's Charge Related to E-codes:

Assure the universal use and reporting of E-Codes in outpatient emergency rooms and all inpatient settings in Minnesota to establish a valid and reliable database on violence-related health service delivery.

E-Codes and Definition		Detail	
E922	Accident caused by firearm missile	E922.0	Handgun
		E922.1	Shotgun (automatic)
		E922.2	Hunting rifle
		E922.3	Military firearms
		E922.8	Other specified firearm missile
		E922.9	Unspecified firearm missile
E955	Suicide and self-inflicted injury by firearms and explosives	E955.0	Handgun
		E955.1	Shotgun
		E955.2	Hunting rifle
		E955.3	Military firearms
		E955.4	Other and unspecified firearm
E965	Assault by firearms and explosives	E965.0	Handgun
		E965.1	Shotgun
		E965.2	Hunting rifle
		E965.3	Military firearms
		E965.4	Other and unspecified firearm
E970	Injury due to legal intervention by firearms		
E985	Injury by firearms and explosives, undetermined whether accidental	E985.0	Handgun
		E985.1	Shotgun
		E985.2	Hunting rifle
		E985.3	Military firearms
		E985.4	Other and unspecified firearm
E991	Injury due to war operations by bullets and fragments	E991.0	Rubber bullets (rifle)
		E991.1	Pellets (rifle)
		E991.2	Other bullets

## RESOURCES

### Provider Training and Gun Safety Counseling

American Academy of Pediatrics  
141 Northwest Point Boulevard  
Elk Grove Village, IL 60007-1098  
(847) 228-5005  
[www.aap.org](http://www.aap.org) (search for firearms)

American College of Physicians  
American Society of Internal Medicine  
190 N. Independence Mall West  
Philadelphia, PA 19106-1572  
(800) 523-1546 x2600  
[www.acponline.org](http://www.acponline.org)

American Medical Association  
515 North State Street  
Chicago, IL 60610  
(312) 464-5000  
[www.ama-assn.org](http://www.ama-assn.org)

Center to Prevent Handgun Violence  
1225 Eye St. NW, Ste. 1100  
Washington, D.C. 20005  
(202) 289-7319  
[www.handguncontrol.org/helping/cphv.htm](http://www.handguncontrol.org/helping/cphv.htm)

### Data Collection

Health Care Coalition on Violence  
Data and Research Committee  
(651) 917-4179

Minnesota Department of Health  
Injury and Violence Prevention Unit  
Minnesota Department of Health  
(651) 281-9841  
[jon.rocsler@health.state.mn.us](mailto:jon.rocsler@health.state.mn.us)

Minnesota Hospital and Healthcare  
Partnership  
2550 University Avenue West  
Suite 350-S  
St. Paul, MN 55114-1900  
(651) 641-1121  
[www.mhhp.com](http://www.mhhp.com)

### Advocacy

American Academy of Pediatrics  
141 Northwest Point Boulevard  
Elk Grove Village, IL 60007-1098  
(847) 228-5005  
<http://www.aap.org/policy/pcyhome.cfm>

American Public Health Association  
800 I Street N.W.  
Washington D.C., 20001-3710  
(202) 777-APHA  
[www.apha.org](http://www.apha.org)

Citizens for a Safer Minnesota  
(612) 349-0671  
P.O. Box 581248  
Minneapolis, MN 55401  
[www.endgunviolence.com](http://www.endgunviolence.com)

Handgun Epidemic Lowering Plan  
(HELP)  
Children's Memorial Medical Center  
2300 Children's Plaza #88  
Chicago, IL 60614  
(773) 880-3826  
[www.helpnetwork.org](http://www.helpnetwork.org)

Minnesota Institute of Public Health  
Stop Gun Injuries and Deaths  
2829 Verndale Avenue  
Anoka, MN 55303  
(612) 427-5310  
[www.miph.org/guns](http://www.miph.org/guns)

## EVIDENCE TABLES

### 1.

<b>Author, Year, and Journal:</b>	Bailey JE, Kellermann AL, Somes GW, Banton JG, Rivara FP and Rushforth NP, 1997, Archives of Internal Medicine.
<b>Study Type/Design:</b>	Case-control study
<b>Population:</b>	Shelby County, Tennessee; King County, Washington; and Cuyahoga County, Ohio
<b>Intervention/Comparison:</b>	Cases: all homicides and suicides occurring in the homes of female victims Controls: randomly selected and matched to cases by neighborhood, sex, race, and age range
<b>Length of Intervention:</b>	August 23, 1987 through August 23, 1992
<b>Outcome Measure:</b>	Risk factors for violent death of women in the home and particularly to assess the relationship between domestic violence, firearms in the home, and homicide or suicide. Interviewed case proxies and control proxies or controls.
<b>Major Result(s):</b>	<ul style="list-style-type: none"> <li>• Suicides were almost exclusively white women who were older, better educated and had a higher socioeconomic status.</li> <li>• Strongest risk factor for suicide was a history of mental illness or depression. Suicide was also independently associated with living alone, keeping 1 or more guns in the home, living in a rented dwelling, and domestic abuse. Keeping 1 more guns in the home was associated with a higher rate of suicide even after adjusting for depression and living alone. Domestic abuse was not associated after controlling for other variables.</li> <li>• Homicide victims were disproportionately African American and almost 70% had a low socioeconomic status.</li> <li>• Independent risk factors for homicide included: living alone, illicit drug use by a member of the household, prior domestic violence, having 1 or more guns in the home, and prior arrest of a household member.</li> <li>• Homicide by a spouse, lover or close relative was associated with illicit drug use by victim or any household member, prior domestic violence, renting the home, and keeping 1 or more guns in the home.</li> <li>• Homicide by a non intimate acquaintance, more distant relative, stranger, or unidentified assailant was most strongly associated with history of arrest of the victim or any household member and living alone. Keeping a gun in the home was associated but not statistically significant.</li> </ul>
<b>Comments:</b>	The authors conclude "Physicians can play an important role in preventing violent deaths by recognizing and addressing risk factors for suicide and homicide."

### 2.

<b>Author, Year, and Journal:</b>	Barkin S, Duan N, Fink A, Brook RH, and Gelberg L, 1998, Archives of Pediatric and Adolescent Medicine
<b>Study Type/Design:</b>	Descriptive/mailed questionnaire
<b>Population:</b>	325 primary care Los Angeles County pediatricians, family physicians, and pediatric nurse practitioners (N=465)
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Self-reported counseling behavior regarding gun safety during routine well-child exams of children 5 years of age and younger.
<b>Major Result(s):</b>	<ul style="list-style-type: none"> <li>• 73% pediatricians, 83% family practice physicians, and 94% pediatric nurse practitioners surveyed believe that it would be beneficial to counsel families on firearm safety, only 38% do so (39% pediatricians, 37% family practice physicians, and 94% pediatric nurse practitioners).</li> <li>• 20% of clinicians surveyed currently counsel more than 10% of their patient families.</li> <li>• Among those who report counseling, slightly more than half believe it is effective (38% pediatricians, 58% family practice physicians, and 49% pediatric nurse practitioners).</li> <li>• Counseling rates were increased among clinicians who were young, female, household firearm owners, and who perceived counseling as beneficial.</li> <li>• Only 13% report that having more time would affect counseling while 41% report having a patient education handout would affect counseling.</li> </ul>
<b>Comments:</b>	There is a great disparity between belief and practice in relation to firearm safety counseling.

## A REVIEW OF THE RESEARCH ON GUN INJURIES

### 3.

<b>Author, Year, and Journal:</b>	Brent DA, Perper JA, Allman CJ, Moritz GM, Wartella ME and Zelenak JP, 1991, JAMA
<b>Study Type/Design:</b>	Case-control study
<b>Population:</b>	Adolescent suicide victims and two psychiatric inpatient groups from Western Pennsylvania
<b>Intervention/Comparison:</b>	Cases: adolescent suicide victims Controls: suicide attempters and never suicidal psychiatric controls
<b>Length of Intervention:</b>	Cases were drawn from July 1986 through February 1988
<b>Outcome Measure:</b>	Determine whether the presence of guns in the home, the type of gun, and the method of storage is associated with an increased risk for adolescent suicide.  Cases: interviewed patients, siblings, and close friends. Controls: interviewed controls during hospitalization and parents
<b>Major Result(s):</b>	Firearms were more frequently in the homes of suicide victims than suicide attempters (OR = 4.5) or psychiatric controls (OR = 4.2). <ul style="list-style-type: none"><li>• Victims had more guns in their homes.</li><li>• Victims were more likely to have both long guns and handguns.</li><li>• Victims with access to both handguns and long guns were slightly more likely to use the handgun than the long gun, the difference was not statistically significant.</li><li>• There were no significant differences in firearm storage practices among the three groups.</li><li>• Victims used guns regardless of whether they were stored lock, stored separately from ammunition, or stored loaded.</li></ul>
<b>Comments:</b>	This was a small sample drawn from one geographic region of the country.

### 4.

<b>Author, Year, and Journal:</b>	Borowsky IW and Ireland M, 1999, Archives of Pediatric and Adolescent Medicine
<b>Study Type/Design:</b>	Mail survey
<b>Population:</b>	A national random sample of 1350 pediatricians, divided equally among residents in their final year of training, practitioners who had completed their residency training within the last 5 years, and those who had completed their training more than 5 years ago (41% response rate).
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Knowledge, attitudes, training, and current practices regarding violence prevention counseling. Self-reported.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• 54% of senior residents, 55% of practitioners who completed residency within the past five years, and 58% of practitioners who completed residency more than five years ago, never or rarely "identify families who have guns in the home."</li><li>• only 27% of residents and 11% of practitioners report receiving training in medical school for the prevention of child/adolescent violence, almost 75% of residents and 38% of practitioners received such training in residency, and 43% received training in continuing medical education.</li><li>• 25% of senior residents and 38% of practitioners had not received formal training in child/adolescent violence prevention.</li><li>• 76% of residents and 83% of practitioners indicated that they had received "less than adequate" or "no" preparation to provide violence prevention counseling.</li><li>• 49% indicate that they need more information on firearms.</li><li>• Counseling practices followed beliefs about effectiveness. Pediatricians who believed parents would rarely or never follow pediatricians advice about storing firearms unloaded and locked were more likely to rarely or never identify families who have guns in the home (73% versus 55%).</li><li>• Receiving training in violence prevention, whether in medical school, residency, fellowship or continuing medical education, increased the likelihood of providing violence prevention counseling.</li></ul>
<b>Comments:</b>	The primary limitation of this study was the potential for response bias, with a response rate of 41%.

### 5.

<b>Author, Year, and Journal:</b>	Carrington PJ, Moyer S, 1994, American Journal of Psychiatry
<b>Study Type/Design:</b>	Retrospective comparison of suicide death rates before and after handgun legislation
<b>Population:</b>	Ontario, Canada

## A REVIEW OF THE RESEARCH ON GUN INJURIES

<b>Intervention/Comparison:</b>	Compared firearm and non firearm suicide rates before and after handgun legislation
<b>Length of Intervention:</b>	1965 – 1977 and 1979 – 1989
<b>Outcome Measure:</b>	Assess the impact of a 1978 Canadian gun control law on suicide rates in Ontario, Canada. Data published by Statistics Canada.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• There was no change in the mean overall suicide rate between the two time periods.</li><li>• Firearm, non firearm, and total suicide rates showed significant changes in trend over time after 1978.</li><li>• All three suicide rates increased between 1965 and 1977, and after 1978 the firearm suicide rate had a nonsignificant downward trend and non firearm and total suicide rates showed significant downward trends.</li><li>• Immediately after the 1978 law there was one-time drop in firearm and total suicide rates (but not non firearm suicides). The authors suggest this drop was caused by the legislation.</li><li>• Prior to the legislation firearms were involved in 30% of all suicides and after the legislation firearms were involved in 26% of the suicides. A statistically significant drop.</li><li>• Authors conclude that there was a decrease in firearm suicides after the law and that there was no method substitution.</li></ul>
<b>Comments:</b>	This study repeated and expanded some of the analyses in the Rich, Young, Fowler, Wagner, and Black 1990 study.

### 6.

<b>Author, Year, and Journal:</b>	Cassel CK, Nelson EA, Smith TW, Schwab CW, Barlow B, Gary NE, 1998, Annals of Internal Medicine
<b>Study Type/Design:</b>	Descriptive/structured telephone interview
<b>Population:</b>	Random sample of members of the American College of Physicians and The American College of Surgeons 457 internists, 458 surgeons interviewed (N=1108)
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Self-reported opinions and clinical behavior ascertained using 55 questions in six domains (experience with firearms, knowledge about clinical sequelae of firearm injury, knowledge about public policies on firearm violence, attitudes toward public policies on firearm violence, clinical practice behavior, and education and training)
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• Most respondents (94% of internists, 87% of surgeons) believe that firearm violence has become a major public health issue.</li><li>• 84% of internists and 72% of surgeons believe that physicians should be involved in firearm injury prevention although less than 20% of those surveyed are.</li><li>• 4.4% of internists and 1.7% of surgeons frequently talk to patients about having a gun in the home.</li><li>• 63% of internists and 52% of surgeons are interested in receiving education about firearm injury prevention.</li><li>• 84% of internists and 64% of surgeons believe physicians should support efforts to enact legislation restricting possession or sale of handguns.</li></ul>
<b>Comments:</b>	There is a great disparity between belief and practice in relation to firearm safety counseling.

### 7.

<b>Author, Year, and Journal:</b>	Cummings P, Koepsell TD, Grossman DC, Savarino J, Thompson RS, 1997, American Journal of Public Health
<b>Study Type/Design:</b>	Case-control study
<b>Population:</b>	Members of a large HMO
<b>Intervention/Comparison:</b>	Cases: 353 suicide victims and 117 homicide victims who were members of the HMO Controls: Five controls were matched to each case on age, sex, and zip code of residence. Controls were randomly selected from HMO members on the day the case died.
<b>Length of Intervention:</b>	1980 through 1992
<b>Outcome Measure:</b>	Determine whether the purchase of a handgun from a licensed dealer is associated with an increased risk of homicide or suicide and whether association varies with time. Handgun purchase information was obtained from the Department of Licensing. Death information was obtained from the computerized

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Washington State Death Certificates, which were compared to the HMO membership records to identify cases.

**Major Result(s):**

- 52.7% of the suicides used a gun.
- 56.4% of the homicides involved a gun.
- The relative risk for suicide given a family handgun purchase was 1.9.
- The relative risk for suicide involving a gun was 3.1 with a family handgun purchase.
- The risk was greatest within the first year of purchase but remained elevated even after five years.
- The relative risk for homicide with a family handgun purchase was 2.2 and there was no statistically significant relationship to the time since purchase.
- There was a stronger association between handgun purchase and homicide as the number of handguns purchased increased.

**Comments:**

This study did not attempt to measure or discuss the effects of previous handgun ownership.

**8.**

**Author, Year, and Journal:**

Everett SA, Price JH, Bedell AW, Telljohann SK, 1997, Journal of Community Health

**Study Type/Design:**

Descriptive/mail survey

**Population:**

Random sample of 600 members of the American Academy of Family Physicians (55% response rate)

**Intervention/Comparison:**

NA

**Length of Intervention:**

NA

**Outcome Measure:**

Training experience in firearm safety counseling, prevalence of firearm safety counseling, perceptions regarding such counseling. Ascertained by self-report.

**Major Result(s):**

- 78% of physicians reported that they lacked training regarding firearm safety counseling.
- 52% never counseled their patients regarding firearm safety, 32% rarely did, 12% sometimes did, 4% usually did, 1% always did.
- 50% believed firearm safety counseling should have a very low or low priority in their practice.
- 13% believed that it should be a high or a very high priority.
- Identified barrier to providing such counseling included the following: lack of time (53%), unsure what to tell parents (26%), belief that parents would not follow advice if given (25%), belief that firearm injuries and fatalities are not a problem for patient population (24%).
- Generally, counseling not believed to be effective in reducing injuries or deaths, especially suicides or intentional injuries and deaths.

**Comments:**

In this article, belief and practice are in agreement.

**9.**

**Author, Year, and Journal:**

Fargason CA, Johnston C, 1995, Archives of Pediatric and Adolescent Medicine

**Study Type/Design:**

Descriptive/mail survey

**Population:**

Population-based sample of 260 primary care pediatricians who were members of the Alabama Chapter of the American Academy of Pediatrics (67% response rate)

**Intervention/Comparison:**

NA

**Length of Intervention:**

NA

**Outcome Measure:**

This study sought to determine the proportion of pediatricians who were gun and handgun owners as well as their safety behaviors and counseling practices. Ascertained by self-report.

**Major Result(s):**

- 51% of pediatricians surveyed owned a gun.
- 34% owned a handgun.
- 11% of the pediatricians surveyed kept a loaded gun in their home or in their car.
- Less than 32% of pediatricians surveyed routinely counseled patients about gun safety.

**Comments:**

This article illustrates that gun ownership is higher among pediatricians in the South than it is in other regions of the country.

**10.**

**Author, Year, and Journal:**

Grossman DC, Mang K, Rivara FP, 1995, Archives of Pediatric and Adolescent Medicine

**Study Type/Design:**

Descriptive cross-sectional/mail survey

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<b>Population:</b>	Active members of the Washington state chapters of the American Academy of Pediatrics and the American Academy of Family Physicians (53% response rate)
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Attitudes, beliefs, and current practices regarding firearm safety counseling. Ascertained through self-report.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• 20% of pediatricians and 8% of family practice physicians currently counsel at least 5% of their patients regarding gun safety.</li><li>• Pediatricians were more likely to believe that physicians have a responsibility to do so (70%) than were the family practice physicians (47%).</li><li>• 32% of pediatricians and 19% of family practice physicians recommend the removal of guns from the home.</li><li>• 97% of pediatricians and family practice physicians believe that firearms should be kept unloaded and locked up.</li><li>• Barriers to counseling identified by physicians are as follows: lack of time (37% of pediatricians and 48% of family practice physicians), don't know what to tell families (30% of both pediatricians and family practice physicians).</li></ul>
<b>Comments:</b>	Although many of the physicians surveyed believe they have a responsibility to counsel about firearm safety, few do so.

### 11.

<b>Author, Year, and Journal:</b>	Haught K, Grossman D, Connell F, 1995, Pediatrics
<b>Study Type/Design:</b>	Focus group discussion Descriptive cross-sectional/survey
<b>Population:</b>	Parents of pediatric patients from four public pediatric clinics in a large metropolitan area (88% response rate)
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Characteristics and experiences associated with gun ownership among low-income urban families in addition to their level of receptiveness regarding firearm injury counseling. Ascertained by self-report.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• 20% owned at least one firearm.</li><li>• Of these, 46% reported keeping gun locked separate from bullets, 35% reported using a trigger lock, 30% reported keeping the gun loaded, 10% reported keeping gun loaded and unlocked.</li><li>• 47% reported that they would follow and 37% reported that they would think about following a provider's advice to not keep a gun in the home.</li><li>• 82% of respondents reported that they would welcome gun safety storage information from their provider.</li><li>• 11% report having received firearm safety counseling from their child's health care provider.</li></ul>
<b>Comments:</b>	Parents in this study were very receptive to obtaining information from their doctor regarding gun safety.

### 12.

<b>Author, Year, and Journal:</b>	Kaplan MS, Adamek ME, Rhoades JA, 1998, American Journal of Preventive Medicine
<b>Study Type/Design:</b>	Descriptive/mailed survey
<b>Population:</b>	Probability sample of 300 internal medicine and family practice primary care physicians in Illinois drawn from the American Medical Association Physician Masterfile (63% response rate)
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	The degree to which physicians inquire about firearm availability in the homes of their depressed and suicidal elderly patients. Factors associated with physicians' likelihood of inquiring about the presence of firearms. Ascertained by self-report.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• 58% of physicians surveyed reported having asked elderly patients or their family members whether or not the patient has access to a gun.</li><li>• Factors that differentiated physicians who ask from physicians who don't ask were as follows: continuing medical education training in suicide risk assessment, expertise in geriatric mental health, confidence in diagnosing depression, having a patient mention suicide during the past year, and indicating patient reluctance as a barrier to mental health treatment.</li></ul>
<b>Comments:</b>	Physicians who work with depressed or suicidal elderly persons need to be educated about the prevalence of elderly suicide and the prevalence of firearms as a suicide method among this population.

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13.

- Author, Year, and Journal:** Kellermann AL, Rivara FP, Rushforth NB, Banton JG, Reay DT, Francisco JT, Locci AB, Prodzinski J, Hackman B, Somes G, 1993, The New England Journal of Medicine
- Study Type/Design:** Case-control study
- Population:** Shelby County, Tennessee, King County, Washington, and Cuyahoga County, Ohio
- Intervention/Comparison:** Cases: all victims of homicide in the home (excluding children under 12)  
Controls: households were randomly selected from the neighborhood and controls were matched to cases on sex, race, age range, and neighborhood of residence
- Length of Intervention:** August 23, 1987 – August 23, 1992
- Outcome Measure:** Risk factors for homicide in the home. Interviewed case proxies and controls, n = 388 matched pairs
- Major Result(s):**
- Six variables were strongly and independently associated with an increased risk of homicide in the home: rented home, living alone, any household member ever hit or hurt in a fight in the home, any household member ever arrested, any household member ever used illicit drugs, and one or more guns in the home.
  - The link between guns and homicide in the home was found for men and women, blacks and whites, and younger and older people.
  - Gun ownership was most strongly associated with homicide by a family member or intimate acquaintance (adjusted OR = 7.8).
  - Gun ownership was not significantly linked to an increased risk of homicide by unidentified intruders or strangers.
  - There was no evidence of a protective benefit of gun ownership for any subgroup.
- Comments:** This study only examined homicides in the home.

14.

- Author, Year, and Journal:** Kellermann AL, Rivara FP, Somes G, Reay DT, Francisco J, Banton JG, Prodzinski J, Fligner C, Hackman BB, 1992, The New England Journal of Medicine
- Study Type/Design:** Case-control study
- Population:** Shelby County, Tennessee and King County, Washington
- Intervention/Comparison:** Cases: all suicides in the home  
Controls: households were randomly selected from the neighborhood and controls were matched to cases on sex, race, age range, and neighborhood of residence
- Length of Intervention:** August 23, 1987 – April 30, 1999
- Outcome Measure:** Assess the strength of the association between the availability of firearms and suicide. Data was obtained from the police and medical examiner and by interviewing case proxies and controls.
- Major Result(s):**
- Six variables were strongly and independently associated with suicide in the home: failure to graduate from high school, living alone, consumption of alcoholic beverages, previous hospitalization due to drinking, current use of prescription medication for depression or mental illness, and use of illicit drugs.
  - An analyses that controlled for these six covariates found that keeping one or more firearms in the home was strongly associated with an increased risk of suicide in the home (OR = 4.8).
  - The increased risk of firearm ownership was for men, women, all ages, and whites (no subgroup analysis on non-whites could be performed).
  - Firearm ownership was even more strongly associated with an increased risk of suicide for people with no history of depression or mental illness.
  - There was an even higher risk of suicide for homes with a loaded firearm, an unlocked firearm, or one or more handguns.
- Comments:** This study only examined suicides in the home.

15.

- Author, Year, and Journal:** Kellermann AL, Somes G, Rivara FP, Lee RK, Banton JG, 1998, The Journal of Trauma, Injury, Infection and Critical Care
- Study Type/Design:** Population-based study of fatal and nonfatal gunshot injuries
- Population:** All victims of fatal and nonfatal gunshot injuries in three U.S. cities, n = 626.
- Intervention/Comparison:** Compared the number of legally justifiable shootings and shootings in self-defense to the number of assaults/homicides, suicides or attempted suicides, and unintentional shootings.
- Length of Intervention:** Memphis = 12 months  
Galveston and Seattle = 18 months



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<b>Outcome Measure:</b>	Determine the relative frequency with which guns in the home are used to injure or kill in self-defense versus how often they are involved in unintentional injury, suicide attempts, criminal assaults or homicides. Data was obtained from police, medical examiner, emergency medical services, emergency departments, and hospital records.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• 9% of the cases were unintentional, 89% of these took place in the victim's home, 85% of the victims accidentally shot themselves.</li><li>• 19% of the cases were attempted or completed suicides, 89% were in the victim's home, and 89% resulted in death.</li><li>• 79% of the cases were assaults, 68% of victims were shot in their home, 40% were shot by strangers or unidentified assailants, 40% were shot by non intimate acquaintances, and 19 were shot by spouses, lovers, intimate acquaintances, relatives, or roommates.</li><li>• 3% of the cases involved unclear or conflicting circumstances.</li><li>• 3% of the cases were legally justifiable.</li><li>• The ratio of unintentional shooting, criminal assaults, and suicides involving a gun exceeded the number of self-defense and legally justifiable shootings by a ratio of 22:1.</li></ul>
<b>Comments:</b>	The number of assaults appears to be very high in this study.

16.

<b>Author, Year, and Journal:</b>	Kellermann AL, Westphal L, Fischer L, Harvard B, 1995, JAMA
<b>Study Type/Design:</b>	Prospective case series
<b>Population:</b>	Every case of unwanted entry into an occupied single family dwelling in Atlanta, Georgia from June 1 1994 to August 31 1994
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Determine how frequently firearms are used to resist home invasion crimes. Cases were obtained from the Atlanta Police Department reports, n = 198.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• In 42% of the cases there was no confrontation because the offender left silently or fled after being detected.</li><li>• 28% of the crimes involved the use or display of a weapon.</li><li>• 16% of the offenders were known to have a weapon.</li><li>• 3% (6) of the victims were shot.</li><li>• Police reports rarely commented on the presence or absence of a gun in the home and only mentioned it in nine reports.</li><li>• Only three individuals (1.5%) used a firearm in self-defense and none were injured but one lost property.</li><li>• When a confrontation occurred the method of resistance did not significantly influence the outcome.</li><li>• Three victim's guns were stolen by an intruder without being detected.</li><li>• 1 gun was missing when the victim tried to retrieve it.</li><li>• 1 victim lost his gun in a scuffle with the offender.</li><li>• 1 victim locked herself in the bathroom and was threatened with her own gun by her ex-boyfriend.</li></ul>
<b>Comments:</b>	The sample size in this study is extremely small.

17.

<b>Author, Year, and Journal:</b>	Knight-Bohnhoff K, Harris MB, 1998, Journal of Pediatric Health Care
<b>Study Type/Design:</b>	Descriptive/Questionnaire
<b>Population:</b>	80 parents (43 men and 37 women) whose children attended a Kindercare Learning Center at one of six locations in a Southwestern city in the United States
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Parents' behavior, knowledge, and beliefs regarding unintentional firearm injuries among children Ascertained by self-report.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• 48% of the parents owned at least one gun, which they kept in the home.</li><li>• Parents who owned guns were more likely to be male (66%) and to have been raised in a home with a gun.</li><li>• 52% of gun owners indicated that they would pay more to obtain a gun safety mechanism.</li><li>• 74% of gun owners kept bullets in the house.</li><li>• 50% of gun owners had shown guns to children living in the home.</li></ul>

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- 42% of gun owners kept bullets within 5 feet of gun.
- 37% of gun owners kept gun loaded in the home.
- 18% of gun owners kept gun within reach of a child.
- 29% of gun owners indicated that their children know the whereabouts of the gun(s) in their home.
- None of the gun owners report having spoken with their pediatrician about gun safety and 8% report having spoken with another health care worker.
- Gun owners were significantly more likely to identify education as important in ensuring the safety of their children while non gun owners were more likely to identify removal of the gun as important in ensuring the safety of the gun owners children.
- More than half of the gun owners did not identify any of the strategies recommended by the American Academy of Pediatrics as important in ensuring the safety of their children.
- None of the parents who owned guns had ever spoken to a pediatrician about firearm safety.

**Comments:**

Guns continue to pose a serious risk among families who own guns. Anticipatory guidance does not seem to be reaching this population.

**18.**

**Author, Year, and Journal:**

Kruesi MJP, Grossman J, Pennington JM, Woodward PJ, Duda D, and Hirsch JG, 1999, Journal of the American Academy of Child and Adolescent Psychiatry

**Study Type/Design:**

Prospective Case Control

**Population:**

103 adults whose children (aged 6-19 years) made an emergency department visit for mental health assessment or treatment

**Intervention/Comparison:**

- Emergency department staff educated parents on restricting access to lethal means for suicide (firearms, medications, and alcohol).
- Upon chart review, parents who did not receive the intervention were assigned to the control group.
- Two months later, researchers telephoned the parents in the intervention and in the comparison group to see if they took any restrictive measures.
- Parents who received education were compared with those who didn't.

**Length of Intervention:**

8 months, average follow-up period with parents was 2 months

**Outcome Measure:**

Parental actions to limit lethal means. Ascertained via telephone survey

**Major Result(s):**

- Training emergency department staff and establishing education protocol increased clinicians' delivery of this education to 40% of patients.
- Trained parents were 3.6 times more likely to take action to limit access to lethal means than were untrained parents.
- Parents who limited access to lethal means were more likely to lock up rather than to dispose of lethal means.

**Comments:**

This strategy may hold promise for violence prevention as well.

**19.**

**Author, Year, and Journal:**

Loftin C, McDowall D, Wiersma B and Cottey TJ, 1991, New England Journal of Medicine

**Study Type/Design:**

Ecologic/longitudinal study

**Population:**

Homicides and suicides in D.C. and surrounding metro areas before and after a law restricting handgun use was implemented.

**Intervention/Comparison:**

Restrictive licensing of handguns (possession of firearms to people who hold registration certificates only); newly acquired rifles and shotguns had to be bought in person by licensed dealers and meet specified requirements; firearms must be kept unloaded and disassembled or locked when not in use

**Length of Intervention:**

Law went into effect on 9/24/76; data from 1968-1987 was examined

**Outcome Measure:**

Reduction of gun-related homicides and suicides. Data from National Center for Health Statistics was used to compare:

- Homicides and suicides in D.C. without firearms
- Homicides and suicides with firearms in adjacent metro areas
- Gun-related homicides and suicides before and after the law's implementation (1976)

**Major Result(s):**

- Restricting access to handguns in D.C. resulted in a prompt and dramatic decline of about 25% in homicides and suicides by firearms.
- No significant declines in non-firearm homicides and suicides.
- Adjacent areas did not have significant declines in firearm-related homicides and suicides.

**Comments:**

Law seems to have had a preventive effect.

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20.

- Author, Year, and Journal:** May JP, Martin KL, 1993, Journal of General Internal Medicine
- Study Type/Design:** Quasi-experimental study with only a post test
- Population:** African American men aged 15-34 who visited an ambulatory clinic for unrelated problems
- Intervention/Comparison:** Evaluation of patients' responsiveness to physician counseling about six preventive medicine topics (including firearms). Physicians counseled patients in office and then patient participated in a post visit interview. No comparison group.
- Length of Intervention:** Participants were interviewed immediately after their appointment.
- Outcome Measure:** Evaluate patients' responsiveness to a physician's counseling about firearms and homicide. Self-report in a post visit interview.
- Major Result(s):**
- Of the different counseling topics, 98.1% of patients remembered the discussion of firearms, the most often remembered topic.
  - 34.4% said guns were the most important of the six issues discussed.
  - 81.1% said that it is important for a doctor to talk about guns.
  - 94.3% reported that something the doctor said will change the way he tries to take care of himself.
  - Patients were receptive to learning about guns during an unrelated visit.
- Comments:** Unclear whether or not counseling will have long term effects.

21.

- Author, Year, and Journal:** McDowall D, Wiersema B, 1994, American Journal of Public Health
- Study Type/Design:** National Crime Victimization Survey data
- Population:** National Crime Victimization Survey respondents from 1987 to 1990
- Intervention/Comparison:** NA
- Length of Intervention:** NA
- Outcome Measure:** Study the use of crimes where victims use a gun against the offender.
- Major Result(s):**
- Estimate that 258,460 incidents of defense firearm use occurred from 1987 to 1990, an average of 64,615 incidents per year.
  - Fewer than two victims per thousand defended themselves with a firearm.
  - Among violent crimes (rape, robbery, and assault) a gun was used in self-defense in fewer than 1% of cases (.83%).
  - About 20% of the cases of gun use in self-defense involved government employees at work, presumably police officers.
  - Assault is the most underreported crime. Authors used one method to adjust for the underreporting of domestic assaults and found that it would increase the annual mean number of times a firearm is used in self-defense to 71,216 incidents.
- Comments:** Authors conclude that any bias in the survey would affect numbers by the tens of thousands and not by the hundreds of thousands.

22.

- Author, Year, and Journal:** Oatis PJ, Buderer NMF, Cummings P, Fleitz R, 1999, Injury Prevention
- Study Type/Design:** Quasi experimental study with a pre and post test, no control group
- Population:** Parents of pediatric patients at a Midwest, hospital-based, urban, low-income pediatric practice with a patient population of 70% African American, 23% white, 6% Hispanic, and 1% other
- Intervention/Comparison:** Standardized anticipatory guidance using the American Academy of Pediatrics STOP program was provided to parents. Pediatricians and nurses discussed the dangers of having a gun in the home and they advised families to eliminate guns from the home or store them unloaded and locked. The clinic also displayed STOP brochures, handouts and posters.
- Length of Intervention:** August 1994 to July 1995
- Outcome Measure:** Reported change in gun storage/gun ownership following questionnaire, educational intervention
- Major Result(s):**
- Slight decreases in gun ownership (9.4% to 7.0%), handgun ownership (5.4% to 3.0%), long gun ownership (6.1% to 5.5%), and keeping gun loaded (1.6% to .5%), none statistically significant.
  - Staff reported that overall families were receptive to the intervention.
- Comments:** It is unclear whether or not this lack of an effect is due to the curriculum, delivery method, or the study design having low power to detect differences.

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23.

- Author, Year, and Journal:** Olson LM, Christoffel KK, O'Connor KG, 1997, Archives of Pediatric and Adolescent Medicine
- Study Type/Design:** Descriptive, mail survey
- Population:** 982 pediatricians involved in direct patient care and members of the American Academy of Pediatrics (68.9% response rate), 59% urban, 31% suburban, 9% rural, 43% female
- Intervention/Comparison:** NA
- Length of Intervention:** NA
- Outcome Measure:** Recent experience treating gun injuries, attitudes toward legislation, attitudes toward gun safety counseling, and current gun safety counseling practices. Ascertained through self-report survey format.
- Major Result(s):**
- 82% believe anticipatory guidance regarding guns can reduce injury and death.
  - 75% interested in receiving more training on violence prevention.
  - 95% support asking parents to unload and lock firearms.
  - 66% support encouraging parents to remove handguns.
  - 50% of pediatricians who provide injury prevention counseling report never identifying families who own guns.
  - Women and those who recently treated a gun injury were 75% more likely to always counsel.
  - Inner city pediatricians were more likely than urban pediatricians to urge parents to remove guns from the home.
- Comments:** This study is consistent with other studies of this type among pediatricians.

24.

- Author, Year, and Journal:** Price JH, Clause M, Everett SA, 1995, Patient Education and Counseling
- Study Type/Design:** Descriptive, self-administered survey
- Population:** Patients from three outpatient clinics (medicine, OB/GYN, and urology) at a large U.S. Midwestern, urban hospital (94% response rate), 70% female, 30% male, 60% white
- Intervention/Comparison:** NA
- Length of Intervention:** NA
- Outcome Measure:** Perceptions regarding the physician's role in counseling about firearms
- Major Result(s):**
- 94% of patients surveyed supported gun safety training.
  - 64% thought that physicians can affect public opinion about guns by providing firearm counseling.
  - Patients were less likely to believe that doctor could change their beliefs on ownership (38%) or storage (31%).
  - 34% erroneously believed that people are more likely to be shot by a stranger versus a person who they know.
- Comments:**
- Counseling essential as significant number of patients surveyed lacked knowledge of gun-related risks.

25.

- Author, Year, and Journal:** Price JH, Bedell AW, Everett SA, Oden L, 1997, Journal of Community Health
- Study Type/Design:** Mail survey
- Population:** Family practice residency program directors (71% response rate)
- Intervention/Comparison:** NA
- Length of Intervention:** NA
- Outcome Measure:** Existence of a firearm safety counseling training program. Beliefs and attitudes of directors regarding firearm safety counseling.
- Major Result(s):**
- 19% of residencies had a formal firearm safety counseling training program for their residents.
  - 38% strongly agreed that physicians have a responsibility to counsel on this topic.
  - 14% believed firearm safety counseling could be effective in reducing accidental firearm injuries and deaths (6% believed it could reduce firearm-related suicides, 3% believed it could reduce firearm-related homicides).
  - Reasons for not having one included lack of time (35%), too many other issues (37%), no one to offer it (37%), and lack of resources (33%), not a requirement for Residency Review Committee (25%).
- Comments:** Firearm safety counseling training programs are almost nonexistent among family practice residency programs.

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26.

<b>Author, Year, and Journal:</b>	Price JH, Conley PM, Oden L, 1997, Archives of Pediatric and Adolescent Medicine
<b>Study Type/Design:</b>	Mail survey
<b>Population:</b>	Pediatric residency program directors (77% response rate)
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	A national baseline assessment of the proportion of pediatric residency programs with formal training on firearm safety counseling
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• 1/3 of the residency programs offered formal firearm safety counseling training.</li><li>• 65% of respondents strongly agreed that it is a pediatrician's responsibility to counsel on this topic.</li><li>• 19% thought firearm safety counseling could be effective in reducing the number of accidental firearm injuries or deaths.</li><li>• Resources identified that, if available, could increase the amount of time residencies spend on firearm safety counseling were video training programs (64%), patient education materials (62%), curriculum guides (55%).</li></ul>
<b>Comments:</b>	A much higher percentage of pediatric residency programs offer firearm safety counseling versus family practice residency programs.

27.

<b>Author, Year, and Journal:</b>	Rich CL, Young JG, Fowler RC, Wagner J, Black NA, 1990, The American Journal of Psychiatry
<b>Study Type/Design:</b>	Retrospective comparison study of suicide death rates before and after handgun legislation
<b>Population:</b>	Population of Toronto and Ontario, psychiatric patients in San Diego
<b>Intervention/Comparison:</b>	Suicide rates before and after enactment of gun control legislation (tighter restriction) in Canada. Relationship of psychiatric treatment history to suicide method and gun ownership for men in San Diego.
<b>Length of Intervention:</b>	1973-1977 and 1979-1983 (Canada data) 1981-1983 (California data)
<b>Outcome Measure:</b>	Suicide rates (coroner reports); Method of suicide (coroner reports); Known psychiatric treatment (California only)
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• No statistically significant change in the mean total suicide rates for Toronto or Ontario between the 5 years before legislation and the 5 years after legislation.</li><li>• Significant decrease in the mean proportion of suicides by shooting for men in Toronto but significant increase in mean proportion of men who committed suicide by jumping.</li><li>• In the San Diego study, some age groups of men who had used a gun to commit suicide were significantly less likely to have been hospitalized for psychiatric disorder than men who had used other methods to commit suicide.</li><li>• Gun control restrictions can influence a shift in suicide method.</li></ul>

28.

<b>Author, Year, and Journal:</b>	Shaughnessy AF, Cincotta JA, Adelman A, 1999, Journal of the American Board of Family Practice
<b>Study Type/Design:</b>	Anonymous written survey
<b>Population:</b>	Visitors to family practice offices who were older than 21 years of age and who received care for themselves or a family member. Seven of the family practice offices were part of a single community research network and an additional two rural practices were included.
<b>Intervention/Comparison:</b>	NA
<b>Length of Intervention:</b>	NA
<b>Outcome Measure:</b>	Knowledge, attitudes, and sources of information regarding firearm ownership and firearm safety.
<b>Major Result(s):</b>	<ul style="list-style-type: none"><li>• Firearm ownership varied by location: 16% urban areas, 42% suburban areas, 59% rural areas.</li><li>• 42% of households with children reported owning a firearm.</li><li>• 50% of households stored ammunition locked.</li><li>• 92% disagreed with the statement "my doctor has a responsibility to talk to me about firearm safety".</li><li>• Most (91%) did not view their doctor as a source of information for firearm safety (gun organizations and police were most often cited as sources for firearm information).</li></ul>

## A REVIEW OF THE RESEARCH ON GUN INJURIES

- 20% agreed they would be offended if physician asked about gun safety.
- 40% agreed that they are likely to follow doctor's advice about storing guns (34% disagreed, 26% neutral), but when analyzed by gun ownership there were significant differences (47% of non owners agreed and 29% of owners agreed).
- 14% thought physicians are knowledgeable about gun safety.
- 47% agreed physician doesn't have time.

### Comments:

This article seemed to contain some discrepancies. In the abstract it states that the survey was conducted with patients of 11 family practice clinics while in the methods section only 9 practices are described. The results section states that "of the 1359 surveys distributed, 1214 (89%) were completed" but later in the article it states that they did not track how many surveys were distributed and tracked only how many of the surveys returned were completed.

Some patients had strong opinions about the nature of the questions as well as the perceived agenda of the investigators. In one clinic site the study had to be discontinued after concerns were raised by the local magistrate regarding the Second Amendment.

### 29.

#### Author, Year, and Journal:

Webster DW, Wilson MEH, Duggan AK, Pakula LC, 1992, Pediatrics

#### Study Type/Design:

Mail survey

#### Population:

Members of the Maryland Chapter of the American Academy of Pediatrics (70percent response rate)

#### Intervention/Comparison:

NA

#### Length of Intervention:

NA

#### Outcome Measure:

Pediatricians' attitudes and practices concerning firearm injury prevention counseling

#### Major Result(s):

- 90% agreed legislation making it harder to obtain firearms is a good idea.
- 84% believed gun control legislation would decrease injury/fatality risk to children/adolescents.
- 30% reported having ever counseled about firearm hazards.
- Very few counseled large numbers of their patient families (only 10% counseled 25% or more of the families).
- 97% likely to advise to unload and lock but less likely to advise removal from home; rural and male pediatricians least likely to advise removal.
- Almost 75% believe that providing gun safety counseling is the pediatrician's responsibility.
- 50% pediatricians thought children under 10 are at a greater risk of dying from poison, but in actuality children are 2.5 times more likely to be killed by a gun.
- Concerned with what to tell patient families, lack of time was not a concern.
- Few thought parents would object to counseling.
- Much more confident counseling storage versus removal.

### Comments:

This is consistent with other studies of pediatricians' beliefs and behaviors regarding gun safety counseling.

### 30.

#### Author, Year, and Journal:

Webster DW, Wilson MEH, Duggan AK, Pakula LC, 1992, Pediatrics

#### Study Type/Design:

Questionnaire/focus group

#### Population:

Parents of pediatric patients of three Maryland pediatric clinics (HMO clinic in urban area, private practice in suburban area, private practice in rural area)

#### Intervention/Comparison:

NA

#### Length of Intervention:

NA

#### Outcome Measure:

Parental knowledge, practices, and attitudes about guns and pediatrician gun safety counseling

#### Major Result(s):

- 46% of gun owners versus 10% of non-gun owners believed that their children aged 6 or younger can distinguish a real gun from a toy gun.
- 39% of gun owners believed that they could trust their child with a gun between the ages of 12-15 (9% among non-gun owners).
- 14% of gun owners believed that they could trust their child with a gun under the age of 12 (3% among non-gun owners).
- gun owners relied less on passive strategies (removing guns from the home, keeping guns unloaded and locked up) of gun injury prevention versus active strategies (education, discipline).
- gun owners were more likely to rely on gun owner organizations (NRA) than doctors (38% of gun owners versus 68% of non gun owners) for information regarding gun safety.
- Nine out of ten parents surveyed would tell a pediatrician if they kept a gun in the home.
- Three out of four parents surveyed would follow pediatrician's advice to unload and lock up firearm, 17% would follow advice to remove a firearm.

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**Comments:** Pediatricians will be most successful in reducing gun-related injuries and deaths among their patients if they advocate for passive strategies among their patient families.

31.

**Author, Year, and Journal:** Wintermute GJ, Parham CA, Beaumont JJ, Wright M, Drake C, 1999, The New England Journal of Medicine

**Study Type/Design:** Population-based cohort study

**Population:** State of California

**Intervention/Comparison:** Compared handgun purchasers in California with the general adult population of the state

**Length of Intervention:** Observation period began with the date of handgun purchase (1991) and ended December 31, 1996

**Outcome Measure:** Mortality of handgun purchasers compared to the general adult population. Obtained handgun purchase information from the California Department of Justice. Mortality information was obtained from the state's automated mortality file.

**Major Result(s):**

- Suicide by any method was the leading cause of death among handgun purchasers in the first year after purchase. When suicides were separated by method, suicide by firearms ranked second.
- After adjusting for age and sex, handgun purchasers were at a significantly greater risk for suicide in the first year after purchase.
- Women were at especially high risk for suicide.
- Rates of suicide were highest immediately after purchase and declined over time.
- After adjusting for age male handgun purchasers were at a lower risk for homicide, and at a lower risk for dying from heart disease, cancer, unintentional injury, and all causes in the first year after purchase.
- The authors note that both men and women had fewer deaths than expected from other causes, which they attribute to the "affluent gun-buyer effect."
- Women who purchased handguns were at a higher risk of homicide.
- Handgun purchasers were presumed by the authors to be more affluent than the general population and they passed a background check which may have led to a "good boy" bias.

**Comments:** The risk of recent handgun purchasers was compared to that the general population with no attempt to determine who already owned guns. The risk of handgun ownership is probably higher than it appears in this study.

## REFERENCES

- American Academy of Child & Adolescent Psychiatry. Policy Statement: Firearm Safety. 1997. Retrieved June 24, 1999 from the World Wide Web: <http://www.aacap.org/publications/policy/ps23.htm>
- American Academy of Pediatrics Committee on Adolescence. Firearms and Adolescents. *Pediatrics*. 1992; 89(4): 784-787. Retrieved June 24, 1999 from the World Wide Web: <http://www.aap.org/policy/04711.html>
- American Academy of Pediatrics Committee on Injury and Poison Prevention. Firearm Injuries Affecting the Pediatric Population. *Pediatrics*. 1992; 89(4): 788-790. Retrieved June 24, 1999 from the World Wide Web: <http://www.aap.org/policy/04712.html>
- American College of Physicians. Firearm Injury Prevention, American College of Physicians. *Annals of Internal Medicine*. 1998; 128(3):236-241.
- Annest JL, Mercy JA. Use of National Data Systems for Firearm-Related Injury Surveillance. *American Journal of Preventive Medicine*. 1998; 15(3 Suppl): 17-30.
- Annest, JL, Mercy JA, Gibson, DR, Ryan GW. National Estimates of Nonfatal Firearm-Related Injuries: Beyond the Tip of the Iceberg. *JAMA*. 1995; 273(22): 1749-1754.
- Bailey JE, Kellermann AL, Somes GW, Banton JG, Rivara FP, Rushforth NP. Risk Factors for Violent Death of Women in the Home. *Archives of Internal Medicine*. 1997; 157:777-782.
- Barkin S, Duan N, Fink A, Brook RH, Gelberg L. The Smoking Gun: Do Clinicians Follow Guidelines on Firearm Safety Counseling? *Archives of Pediatric Adolescent Medicine*. 1998; 152: 749-756.
- Blendon RJ, Young JT, Hemenway D. The American Public and the Gun Control Debate. *JAMA*. 1996; 275(22): 1719-1722.
- Bonnie RJ, Fulco CE, Liverman CT (Eds.). *Reducing the Burden of Injury: Advancing Prevention and Treatment*. Washington D.C.: National Academy Press. 1989.
- Borowsky IW, Ireland M. National Survey of Pediatricians' Violence Prevention Counseling. *Archives of Pediatric and Adolescent Medicine*. 1999; 153: 1170-1176.
- Brent DA, Perper JA, Allman CJ, Moritz GM, Wartella ME, Zelenak JP. The Presence and Accessibility of Firearms in the Homes of Adolescent Suicides: A Case-Control Study. *JAMA*. 1991; 266(21): 2989-2995.
- Brown RL, Goldman LS. *Physician Firearm Safety Guide*. American Medical Association. 1998.
- Burt CW. *Injury-Related Visits to Hospital Emergency Departments: United States, 1992*. Advance Data from Vital and Health Statistics; No 261. Hyattsville, Maryland: National Center for Health Statistics. 1995.
- Carrington PJ, Moyer S. Gun Control and Suicide in Ontario. *American Journal of Psychiatry*. 1994; 151(4): 606-608.
- Cassel CK, Nelson EA, Smith TW, Schwab CW, Barlow B, Gary NE. Internists' and Surgeons' Attitudes Toward Guns and Firearm Injury Prevention. *Annals of Internal Medicine*. 1998; 128: 224-230.
- Centers for Disease Control and Prevention. BB and Pellet Gun-Related Injuries – United States, June 1992 – May 1994. *Morbidity and Mortality Weekly Report*. 1995 Dec 15; 44(49): 909-913.
- Centers for Disease Control and Prevention. Compressed Mortality Data. Retrieved April 12, 2000 from CDC Wonder database on the World Wide Web: <http://wonder.cdc.gov>
- Centers for Disease Control and Prevention. Nonfatal and Fatal Firearm-Related Injuries – United States, 1993 – 1997. *Morbidity and Mortality weekly Report*. 1999 Nov 19; 49(45): 1029-1034.
- Christoffel KK. Toward Reducing Pediatric Injuries From Firearms: Charting a Legislative and Regulatory Course. *Pediatrics*. 1991; 88(2): 379-383.



## A REVIEW OF THE RESEARCH ON GUN INJURIES

- Cook PJ, Lawrence BA, Ludwig J, Miller TR. The Medical Costs of Gunshot Injuries in the United States. *JAMA*. 1999; 282(5): 447-454.
- Cummings P, Koepsell TD, Grossman DC, Savarino J, Thompson RS. The Association between the Purchase of a Handgun and Homicide or Suicide. *American Journal of Public Health*. 1997; 87(6): 974-978.
- DeAngelis CD. Editor's Note. *Archives of Pediatric and Adolescent Medicine*. 1995; 149: 973.
- DeAngelis CD. Editor's Note. *Archives of Pediatric and Adolescent Medicine*. 1997; 151: 306.
- Dolins JC, Christoffel KK. Reducing Violent Injuries: Priorities for Pediatrician Advocacy. *Pediatrics*. 1994; 94(4 Pt 2): 638-651.
- Everett SA, Price JH, Bedell AW, Telljohann SK. Family Practice Physicians' Firearm Safety Counseling Beliefs and Behaviors. *Journal of Community Health*. 1997; 22(5): 313-324.
- Fargason CA, Johnston C. Gun Ownership and Counseling of Alabama Pediatricians. *Archives of Pediatric Adolescent Medicine*. 1995; 149: 442-446.
- Frattaroli S, Teret SP. Why Firearm Injury Surveillance? *American Journal of Preventive Medicine*. 1998; 15(3 Suppl): 2-5.
- Grossman DC, Mang K, Rivara FP. Firearm Injury Prevention Counseling by Pediatricians and Family Physicians: Practices and Beliefs. *Archives of Pediatrics and Adolescent Medicine*. 1995; 149: 973-977.
- Haught K, Grossman D, Connell F. Parents' Attitudes Toward Firearm Injury Prevention Counseling in Urban Pediatric Clinics. *Pediatrics*. 1995; 96(4): 649-653.
- Hennepin County Community Health Department and Minneapolis Department of Health and Family Support. SHAPE 1998: Initial Findings, Survey of the Health of Adults, the Population, and the Environment. Minneapolis, Minnesota, Aug. 1998.
- Ikeda RM, Gorwitz R, James SP, Powell KE, Mercy JA. Fatal Firearm Injuries in the United States, 1962-1994. Atlanta: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 1997. Violence Surveillance Summary Series, No. 3.
- Kaplan MS, Adamek ME, Rhoades JA. Prevention of Elderly Suicide: Physicians' Assessment of Firearm Availability. *American Journal of Preventive Medicine*. 1998; 15(1): 60-64.
- Karlson TA, Hargarten SW. Reducing Firearm Injury and Death: A Public Health Sourcebook on Guns. New Brunswick, NJ: Rutgers University Press. 1997.
- Kellermann AL, Bartolomeos KK. Firearm Injury Surveillance at the Local Level: From Data to Action. *American Journal of Preventive Medicine*. 1998; 15(3 Suppl): 109-112.
- Kellermann AL, Lee RK, Mercy JA, Banton J. The Epidemiologic Basis for the Prevention of Firearm Injuries. *Annual Review of Public Health*. 1991; 12: 17-40.
- Kellermann AL, Reay DT. An Analysis of Firearm-Related Deaths in the Home. *The New England Journal of Medicine*. 1986; 314: 1557-1560.
- Kellermann AL, Rivara FP, Rushforth NB, Banton JG, Reay DT, Francisco JT, Locci AB, Prodzinski J, Hackman BB, Somes G. Gun Ownership as a Risk Factor for Homicide in the Home. *The New England Journal of Medicine*. 1993; 329(15): 1084-1091.
- Kellermann AL, Rivara FP, Somes G, Reay DT, Francisco J, Banton JG, Prodzinski J, Fligner C, Hackman BB. Suicide in the Home in Relation to Gun Ownership. *The New England Journal of Medicine*. 1992; 327(7): 467-72.
- Kellermann AL, Somes G, Rivara FP, Lee RK, Banton JG. Injuries and Deaths Due to Firearms in the Home. *The Journal of Trauma: Injury, Infection, and Critical Care*. 1998; 45(2): 263-267.
- Kellermann AL, Westphal L, Fischer L, Harvard B. Weapon Involvement in Home Invasion Crimes. *JAMA*. 1995; 273(22): 1759-1762.

## A REVIEW OF THE RESEARCH ON GUN INJURIES

Knight-Bohnhoff K, Harris MB. Parent's Behaviors, Knowledge, and Beliefs Related to Unintentional Firearm Injuries Among Children and Youth in the Southwest. *Journal of Pediatric Health Care*. 1998; 12(3): 139-146.

Koo D, Birkhead GS. Prospects and Challenges in Implementing Firearm-Related Injury Surveillance in the United States: Not a Flash in the Pan. *American Journal of Preventive Medicine*. 1998; 15(3S): 120-124.

Kruesi MJP, Grossman J, Pennington JM, Woodward PJ, Duda D, Hirsch JG. Suicide and Violence Prevention: Parent Education in the Emergency Department. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1999; 38(3): 250-255.

Lerner M. Public Safety – Doctor Charts Path to Safer Gun Use – An Atlanta Researcher Brought to the Twin Cities His Message that Gun Violence is Preventable. *Star Tribune*. April 23 1996: 03B.

Lewis R, Erickson L, Storkamp D, Weber C. Changing Perceptions: 1996 Minnesota Crime Survey. *Minnesota Planning Criminal Justice Center*. Dec 1996: 21.

Loftin C, McDowall D, Wiersma B. Evaluating Effects of Changes in Gun Laws. *American Journal of Preventive Medicine*. 1993; 9 (suppl 1): 39-43.

Loftin C, McDowall D, Wiersma B, Cottey TJ. Effects of Restrictive Licensing of Handguns on Homicide and Suicide in the District of Columbia. *New England Journal of Medicine*. 1991; 325(23): 1615-1620.

May JP, Martin KL. A Role for the Primary Care Physician in Counseling Young African-American Men About Homicide Prevention. *Journal of General Internal Medicine*. 1993; 8: 380-382.

McDowall D, Wiersma B. The Incidence of Defensive Firearm Use by US Crime Victims, 1987 through 1990. *American Journal of Public Health*. 1994; 84(12): 1982-1984.

Mercy JA, Ikeda R, Powell KE. Firearm-Related Injury Surveillance: An Overview of Progress and the Challenges Ahead. *American Journal of Preventive Medicine*. 1998; 15(3 Suppl): 6-16.

Mercy JA, Rosenberg ML, Powell KE, Broome CV, Roper WL. Public Health Policy for Preventing Violence. *Health Affairs*. Winter 1993; 7-29.

Miller TR, Cohen MA. Costs of Gunshot and Cut/Stab Wounds in the United States, With Some Canadian Comparisons. *Accident; Analysis and Prevention*. 1997; 29(3): 329-341.

Minnesota Department of Children, Families and Learning Office of Community Services. *Minnesota Student Survey 1989-1992-1995-1998: Behavioral Trends for Minnesota's Youth*. March 1999.

Minnesota Department of Health, Center for Health Statistics. Unpublished data. Received March 22, 2000.

Minnesota Department of Health, Injury and Violence Prevention Unit. *Nonfatal Injury in Minnesota, 1998: Hospitalized and Emergency-Department Treated*. Unpublished. Received April 10, 2000.

Minnesota Department of Health, Injury and Violence Prevention Unit. Unpublished data. Received March 31, 2000.

Minnesota Department of Health, Injury and Violence Prevention Unit. Unpublished data. Received April 20, 2000.

Minnesota Department of Public Safety Bureau of Criminal Apprehension. *State of Minnesota Crime Information – 1998*. Retrieved February 10, 2000 from the World Wide Web: <http://www.dps.state.mn.us/bca/CJIS/Documents/Page-6-005.html>

Minnesota Hospital and Healthcare Partnership. Unpublished data. Received March 2, 2000.

Minnesota Planning, State Demographic Center. *City and township estimates and county estimates*. Retrieved March 22, 2000 from the World Wide Web: <http://www.mnplan.state.mn.us/demography/demogpop.html>

Oatis PJ, Fenn Buderer NM, Cummings P, Fleitz R. Pediatric Practice-Based Evaluation of the Steps to Prevent Firearm Injury Program. *Injury Prevention*. 1999; 5(1): 48-52.

Olson LM, Christoffel KK, O'Connor KG. Pediatricians' Experience With and Attitudes Toward Firearms: Results of a National Survey. *Archives of Pediatric Adolescent Medicine*. 1997; 151: 352-359.

## A REVIEW OF THE RESEARCH ON GUN INJURIES

- Price JH, Clause M, Everett SA. Patients' Attitudes About the Role of Physicians in Counseling About Firearms. Patient Education and Counseling. 1995; 25: 163-170.
- Price JH, Bedell AW, Everett SA, Oden L. Training in Firearm Safety Counseling in Family Practice Residency Programs. Journal of Community Health. 1997; 22(2): 91-99.
- Price JH, Conley PM, Oden L. Training in Firearm Safety Counseling in Pediatric Residency Programs. Archives of Pediatric Adolescent Medicine. 1997; 151: 306-310.
- Rich CL, Young JG, Fowler RC, Wagner J, Black NA. Guns and Suicide: Possible Effects of Some Specific Legislation. The American Journal of Psychiatry. 1990; 147(3): 342-346.
- Rosenberg ML, Hammond WR. Surveillance The Key to Firearm Injury Prevention. American Journal of Preventive Medicine. 1998; 15(3S): 1.
- Saltzman LE, Ikeda RM. Recommended Data Elements for Firearm-Related Injury Surveillance. American Journal of Preventive Medicine. 1998; 15(3 Suppl): 113-119.
- Schuster MA, Franke TM, Bastian AM, Sinaroth S, Halfon N. Firearm Storage Patterns in US Homes with Children. American Journal of Public Health. 2000; 90: 588-594.
- Shaughnessy AF, Cincotta JA, Adelman A. Family Practice Patients' Attitudes Toward Firearm Safety as a Preventive Medicine Issue: A HARNET Study. Journal of the American Board of Family Practice. 1999; 12(5): 354-359.
- Sloan JH, Rivara FP, Kellermann A, Reay DT, Ferris JAJ, Path MRC, Kellermann AL. Firearm Regulations and Rates of Suicide: A Comparison of Two Metropolitan Areas. New England Journal of Medicine. 1990; 322: 369-373.
- Sloan JH, Kellermann A, Reay DT, Ferris JA, Koepsell T, Rivara FP, Rice C, Gray L, LoGerfo J. Handgun Regulations, Crime, Assaults, and Homicide: A Tale of Two Cities. The New England Journal of Medicine. 1988; 319(19): 1256-1261.
- Stennies G, Ikeda R, Leadbetter S, Houston B, Sacks J. Firearm Storage Practices and Children in the Home, United States, 1994. Archives of Pediatric and Adolescent Medicine. 1999; 153: 586-590.
- Teret SP, Wintermute GJ. Policies to Prevent Firearm Injuries. Health Affairs. Winter 1993: 96-108.
- Teret SP, Wintermute GJ, Beilenson PL. The Firearm Fatality Reporting System: A Proposal. Journal of the American Medical Association. 1992; 267(22): 3073-3074.
- Vernick JS, Teret SP. Firearms and Health: The Right to Be Armed with Accurate Information about the Second Amendment. American Journal of Public Health. 1993; 83(12): 1773-1777.
- Webster DW, Wilson MEH, Duggan AK, Pakula LC. Firearm Injury Prevention Counseling: A Study of Pediatricians' Beliefs and Practices. Pediatrics. 1992; 89(5): 902-907.
- Webster DW, Wilson MEH, Duggan AK, Pakula LC. Parents' Beliefs About Preventing Gun Injuries to Children. Pediatrics. 1992; 89(5): 908-914.
- Wintermute GJ, Parham CA, Beaumont JJ, Wright M, Drake C. Mortality Among Recent Purchasers of Handguns. The New England Journal of Medicine. 1999; 341(21): 1583-1589.

## **HISTORY OF THE HEALTH CARE COALITION ON VIOLENCE**

### **The Health Care Coalition on Violence**

In 1995, Minnesota's Governor Carlson formed a Governor's Task Force on Violence as a Public Health Problem whose purpose was to identify the role the private health care sector could play in preventing and intervening in violence. The Task Force was co-chaired by Charlie Weaver, representative from Anoka, and Joanne E. Benson, Lieutenant Governor. Task Force members included senior level administrators from the private health care sector and community leaders.

The Task Force studied the issue of violence for six months and in 1996 issued a report, "Violence as a Public Health Problem," that specified recommendations for action. In addition, the Task Force asked competing private health care systems to sign a contract agreeing to collaborate and formed the Health Care Coalition on Violence (HCCV) to implement the recommendations. This statewide coalition is chaired by David Strand, Chief Operating Officer, Allina Health System. To implement the recommendations of the Task Force, the HCCV formed five committees. These committees and their chairs are:

- Data Collection and Research, Janny Dwyer Brust, MPH, Allina Health System
- Health Plan Coverage and Policy, Michael Scandrett, JD, Minnesota Council of Health Plans
- Practice Guidelines, Education and Training, David McCollum, MD, Minnesota Medical Association
- Primary Prevention, Elizabeth Myhre, Children's Hospitals and Clinics
- Workplace Violence Prevention, Stu Hanson, MD, HealthSystem Minnesota

### **HCCV's Data and Research Committee**

The charge of the Data and Research Committee, which issued this review, is to identify and assess the effectiveness of strategies that the health care system can implement to reduce and intervene in violence. The Data and Research Committee is comprised of representatives from Minnesota's private and public health care sectors as well as various community organizations. In February of 1998, the Committee issued a report, "A Review of the Research on Home Visiting: A Strategy for Preventing Child Maltreatment."