PART I

Magnitude, Concepts, and Epidemiology of Unintentional and Intentional Injury
CHAPTER 1

The Importance of the Injury Problem: Magnitude, Cost, and Preventability

“Injury is the principle public health problem in America today.”
—William Foege, Preface to Injury in America, 1985

WHAT THIS CHAPTER IS ABOUT

How and why has injury prevention become part of the public health agenda? How has a problem area that had been the purview of safety engineers and law enforcement personnel become a focus of local and state health departments and the U.S. Centers for Disease Control and Prevention (CDC)? And what exactly does it mean for the former director of the CDC to say, “Injury is the principle public health problem in America today”?

In some ways the answers to these questions are straightforward. This chapter reviews the magnitude and costs of injury for the United States, both in general terms and relative to other health problems. We see that, by any measure we may choose to apply, injury is a critical component of the public’s health profile. We see that injury is a highly preventable source of morbidity and mortality. We suggest factors that have contributed to injury being neglected as a public health problem. And we see why it makes sense to deal with injury in the same ways we have dealt with acute, infectious, and chronic diseases.

INTRODUCTION

If today should turn out to be an average day in the United States

- 440 people will die of injuries
• close to 5,000 people will be discharged from a hospital after treatment related to nonfatal injuries
• over 400,000 people will visit a physician office or hospital emergency or outpatient department for injury-related health problems.¹

Roughly one third of today’s injury deaths will be the result of motor vehicle injuries, one third the result of homicides and suicides, and one third the result of other types of “unintentional” injuries. Today, there may be a few more or a few less injuries than expected on an average day. Over the course of the year the nation will, tragically, average these numbers of injuries daily. Even more tragically, we know that many, if not most, of these injuries could have been prevented.

Injuries can be fatal or nonfatal. “Injury” is damage or harm to the body resulting in impairment or destruction of health. More specifically, in Injury Prevention: Meeting the Challenge, the National Committee for Injury Prevention and Control (NCIPC) defined injury as “any unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy or from the absence of such essentials as heat or oxygen.”² Injury, therefore, includes trauma from motor vehicle crashes, crushing and piercing by machines, falls, poisoning, burns, suffocation, and drowning. It also includes intentional acts like homicides, suicide, and assault. We usually define injury as occurring during a short period of time, as opposed to the effects of repeated exposures to chemical agents or cumulative damage from repetitive motions (although some categories of injury—such as physical child abuse—can be repetitive over time).

Injury may also be used to encompass psychological as well as physical trauma, such as that resulting from having witnessed a violent death or from being the victim of a hate crime or psychological bullying. Injury is also sometimes used to refer to adverse effects of medical treatment. Psychological harm and medical harm are important areas of concern but ones that are beyond the scope of this book.

Injuries have always been a threat to the public’s well-being, but until the mid-20th century, infectious diseases overshadowed the terrible contribution injury made to human morbidity and mortality. Public health improvements have greatly reduced the prevalence of infectious diseases, first through improved sanitation, then more recently through painstaking surveillance and quick public health follow-up and containment—as with the successful worldwide response to severe acute respiratory syndrome (SARS).

As a result of these improvements in dealing with infectious disease, injury’s negative toll on the public’s health has become more significant. Although heart disease and cancer continue as critical health problems in the United States, the contribution of either to premature deaths (measured as lost years of life before age 75) is less than that of injury because
injury disproportionately affects a younger population, particularly children, teens, and young adults. Today injuries—both unintentional and intentional—constitute a major threat to public health, one that has been termed “the neglected epidemic.” Unfortunately, this shift in significance has not yet been sufficiently reflected in the areas of research and prevention. Exhibit 1-1 shows the role of injury as a cause of death by age group.

Each year about 150,000 to 160,000 Americans die as the result of injuries, a number roughly equivalent to the population of Fort Lauderdale, Florida. Close to two million people are hospitalized annually as the result of injuries, and 8% of all short-stay admissions are injury related.

### Exhibit 1-1

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>YPLL</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>All causes</td>
<td>11,634,261</td>
<td>100.0%</td>
</tr>
<tr>
<td>Unintentional injury</td>
<td>2,159,266</td>
<td>18.6%</td>
</tr>
<tr>
<td>Malignant neoplasms</td>
<td>1,903,274</td>
<td>16.4%</td>
</tr>
<tr>
<td>Heart disease</td>
<td>1,434,511</td>
<td>12.3%</td>
</tr>
<tr>
<td>Perinatal period</td>
<td>924,364</td>
<td>7.9%</td>
</tr>
<tr>
<td>Suicide</td>
<td>666,398</td>
<td>5.7%</td>
</tr>
<tr>
<td>Homicide</td>
<td>579,268</td>
<td>5.0%</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>490,232</td>
<td>4.2%</td>
</tr>
<tr>
<td>HIV</td>
<td>297,276</td>
<td>2.6%</td>
</tr>
<tr>
<td>Cerebrovascular</td>
<td>243,038</td>
<td>2.1%</td>
</tr>
<tr>
<td>Liver disease</td>
<td>236,433</td>
<td>2.0%</td>
</tr>
<tr>
<td>All others</td>
<td>2,700,201</td>
<td>23.2%</td>
</tr>
</tbody>
</table>

In a perfectly rational world we would expect to find injury near the top of society’s list of problems to be dealt with aggressively, but that is not the case. Why not? Why does injury not receive the public attention, the preventive resources, and the policy focus that problems of lesser impact receive?

The short answer is that we do not live in a perfectly rational world. In the real world—at least the United States at this time—injury as a social problem falls victim to several limiting factors. These factors, which are interrelated and synergistic, include the following:

**Limitation #1**—Many people continue to consider injuries to be the result of random, uncontrollable factors that are largely beyond human control—so called “accidents” or “bad luck.” As a result, the public seems to regard injury harm more stoically than is the case with other equally frightening personal disasters over which they (and the medical system) can exercise greater control—such as heart attacks and lung cancer. When it comes to the threat of a cancer slowly and uncontrollably destroying their bodies, or the threat of obesity and fat cells affecting the functioning of their pancreas and heart, the public and policymakers seem to be more fearful and more demanding of solutions than for the tens of thousands of largely preventable motor vehicle deaths that occur in the United States each year. In fact, when it comes to injury risk, people seem to be rather resigned and accepting, reflecting the mistaken belief that injury is an inevitable part of life. This tends to be truer for men than for women (risk taking being “macho”) and, unfortunately, especially the case for teenage males (who believe they are invulnerable). It also tends to be truer for certain causes of injury, such as sports, where risk taking is glorified and macho behavior is rewarded. (The long-term consequences of repeated injury from sports, such as arthritis, never seem to receive a second thought, suggesting that there is a critical need to come up with creative ways to reframe the public’s perception of sports injury.)

**Limitation #2**—Most people don’t think about injury. When they do, they tend to focus their concern on dramatic, multiple-death injuries, such as those resulting from the crash of an airliner or a massacre at a school. Unfortunately, this obscures the fact that the greatest numbers of injuries occur in less newsworthy settings, such as falls or single-death motor vehicle crashes. An airplane crash with more than 100 deaths occurs in the United States perhaps once a year or less; yet more than 100 people are killed in motor vehicle crashes every day (Exhibit 1-2). The tragic deaths that occurred on September 11, 2001 represented one week’s worth of “normal” US injury deaths—a death toll that continues week after week, year after year. A critical task for the injury prevention community is to refocus the public’s attention—and the federal and state governmental response—onto these more common, much more deadly, and highly preventable, kinds of injuries.
Limitation #3—The media doesn’t educate the public regarding injury. In fact, a major difficulty in refocusing the public’s attention toward a clearer understanding of the injury problem comes from the print and broadcast media, which sensationalize injury events and focus on separate and unique injury events rather than patterns of injury and long-term trends in injury occurrence. For example, many people are surprised to learn that there are more suicides than homicides in the United States annually and that in some states guns cause more injury deaths than do motor vehicles. Moreover, prevention doesn’t make it into the headlines; the media rarely suggests possible preventive approaches. And too often the media conveys bad examples, such as picturing cyclists without helmets.

Limitation #4—It is no “accident” that prevention is slighted. Prevention of injury—much more than a disease such as influenza—can present a problem and a challenge to powerful vested interests. This is because the vectors and environments that contribute to injury are largely manmade: motor vehicles, firearms, and consumer products. Making these vectors and environments safer—either voluntarily or through government regulation—can cut into profits. The stakes can be high in fending off public efforts to enhance safety, with business considerations easily overshadowing safety concerns. It is good news for public health if safety sells, but what if it doesn’t sell—or manufacturers fear it won’t sell? The automobile industry has a long history of resisting technological innovations to make cars more crashworthy. Ironically, after decades of ridiculing Volvo’s emphasis on safety over style, Detroit discovered that safety does indeed sell. Similarly, the technology exists to make firearms

Exhibit 1-2 Investigation of Crashes

When a plane goes down, it is not called an “accident,” it’s called a “crash.” The National Transportation Safety Board investigates the cause and then works to prevent it from happening again. The Federal Aviation Administration employs about 40,000 people to accomplish its goals. In contrast, we lose more than 150 times as many people in car crashes. Each “crash” is called an “accident,” we don’t investigate them with the same level of attention, and we just hope it won’t happen again.

—Chuck Hurley, noting that about 600 staff members at the National Highway Traffic Safety Administration work on reducing the number of car crashes.

into safer consumer products, but the gun industry seems unwilling to incorporate this technology unless forced to do so. The drawback of such a situation—as seen with airbags—is that when injury prevention principles based on scientific findings are forced on industry, the result can be a poorly executed, minimalist adoption of safety technology.

Limitation #5—Vested interests, with public relations support, often confuse the injury prevention issue. Industry, ably assisted by the media, continue to blame the victim and portray injury as largely a matter of individual fault—carelessness, stupidity, bad habits, or aberrant behavior—much more so than with heart disease, cancer, or infectious disease. Rather than exploring ways in which product designs can be improved to enhance safety, the victim is criticized for not using the product properly. This is especially true when it comes to firearms. The current White House also has a focus on the individual taking responsibility for his or her actions rather than on using government solutions, even when those solutions could be more effective. Regulatory approaches to make broad-based changes that could reduce the injury rate are not in vogue.

Limitation #6—Injury prevention lacks the mystique and high-technology aura that excites the medical establishment and surrounds many other areas of disease prevention. A public that is acculturated to wonder drugs, coronary bypass surgery, and the many promised wonders to come from human genome and stem cell research is understandably less excited by programs to lower hot water heater temperatures, encourage helmet use, and increase alcohol taxes. A helmet use program for all elementary schools in a city lacks the human interest of a desperate search to find a transplantable liver for a single, but therefore identifiable (i.e., more sympathetic) sick child in that same city. (Ironically, the organ donor for such a procedure is often a child who has died from a preventable injury, such as a head injury.)

Limitation #7—Similarly, the injury prevention community has had only limited success in influencing policymakers, certainly as compared with other areas of public health prevention, such as those concerned with heart disease and cancer prevention. The injury prevention community is not well versed in what is and what is not allowable when communicating with policymakers. Injury prevention practitioners and researchers are most often based in state agencies and academic centers, with funding derived from federal and state budgets and from foundations. These funding sources often restrict or completely prohibit funding recipients from engaging in advocacy or lobbying. Those who work in state government programs are usually not even allowed to have direct contact with policymakers unless clearance is obtained at a high level, such as a commissioner’s office. Such restrictions ap-
ply to both proactive communications and to responses to direct requests from lawmakers.

Advocacy coalitions concerned with injury issues are better able to educate and influence policymakers. But advocacy coalitions have tended to focus on postinjury treatment rather than prevention. A recent exception to this phenomenon is the work of the Suicide Prevention Action Network USA (SPAN USA), a group which “channels the energy and passions of those touched by suicide into action and advocacy across the U.S.A.”3 A recent SPAN USA success was the passage of the federal Garrett Lee Smith Memorial (Youth Suicide Early Intervention and Prevention Expansion) Act. See discussion in Chapter 14.

Limitation #8—A general lack of information and interest in injury prevention can be found not only amongst the public in general but also, unfortunately, within the medical profession, where prevention of any kind has long been relegated to second (or third or fourth) place. As measured in terms of relative impact on morbidity and mortality, research dollars flow disproportionately away from injury prevention and toward more clinical disease entities. Injury prevention also is slighted in training programs for physicians and other health care professionals, and relatively few physicians are trained in injury causation and prevention. A survey of pediatricians indicated that only 18% received education on drowning prevention during their pediatric residency training, despite the fact that drowning is the third leading cause of unintentional injury death in the 0- to 19-year old population.4 The medical profession has been very slow to acknowledge that injury is a health problem with a supporting science that can be studied in much the same manner as the science that helps us deal more effectively with the disease-related areas of health.

Limitation #9—Although injury can be studied and dealt with scientifically, the entanglement of science and ideology can hinder this process, resulting in an age-old problem (e.g., Galileo). The political debate over stem cell research is a prominent current entwining of science and ideology. The most prominent example involving injury prevention research is the restriction regarding firearms that is imposed on all CDC intramural activities and extramural grant funding. Scientific research regarding firearms has been hampered by an ideology that equates all such research with the first step toward restricting firearm ownership. In 1997, the United States Congress directed the CDC to include in its grant funding awards a “Prohibition on Use of CDC Funds for Certain Gun Control Activities,” which specifies that “CDC’s funds may not be spent on political action or other activities designed to affect the passage of specific Federal, State, or local legislation intended to restrict or control the purchase or use of firearms.”5 As a result of this clause, CDC grantees have become
“gun shy” and are hesitant to even include scientific presentations on firearms violence on conference agendas.

Limitation #10—Injury surveillance and data are limited, especially at the local level—and especially when it comes to morbidity data. This makes it difficult to convince communities that there is an injury problem, to understand the problem, and to develop effective preventive programs. This stands in contrast to the public attention and support associated with the careful surveillance and quick responses associated with health problems such as SARS and West Nile virus.

Limitation #11—Finally, most state governments are in financial distress, in part because of cutbacks in federal support programs. And unlike the federal government, states are not able to run deficits. The result has been continual cutbacks in state programs. Public health lacks the political constituency and clout of other contenders for shrinking state dollars (e.g., highway construction, health care services). Moreover, within public health, injury prevention is relatively new and not well established. Often this can convert into “last funded, first defunded.” For example, suicide prevention programs had just begun to get line item funding in some states. Many of these programs have had that state funding cut in recent years.

Despite these conceptual limitations or irrationalities on the part of the public, the media, and the health professions, much is known about how injuries occur and how injuries can be prevented. Much could be done with this knowledge. Various agendas for injury reduction exist, such as the NCIPC publication *CDC Injury Research Agenda* and the injury prevention targets found in *Healthy People 2010*. These Year 2010 Objectives call for specific targets such as

- **15-4.** Reduce the proportion of persons living in homes with firearms that are loaded and unlocked.
  
  Target: 16 percent.
  
  Baseline: 19 percent of the population lived in homes with loaded and unlocked firearms in 1998 (age adjusted to the year 2000 standard population).

- **15-8.** Reduce deaths caused by poisonings.
  
  Target: 1.5 deaths per 100,000 population.
  
  Baseline: 6.8 deaths per 100,000 population were caused by poisonings in 1998 (age adjusted to the year 2000 standard population).

- **15-10.** Increase the number of States and the District of Columbia with statewide emergency department surveillance systems that collect data on external causes of injury.
  
  Target: All States and the District of Columbia.
  
  Baseline: 12 States had statewide ED surveillance systems that collected data on external causes of injury in 1998.
• 15-16. Reduce pedestrian deaths on public roads.
  Target: 1.0 pedestrian death per 100,000 population.
  Baseline: 1.9 pedestrian deaths per 100,000 population occurred on public roads in 1998.
• 15-21. Increase the proportion of motorcyclists using helmets.
  Target: 79 percent.
  Baseline: 67 percent of motorcycle operators and passengers used helmets in 1998.
• 15-22. Increase the number of States and the District of Columbia that have adopted a graduated driver licensing model law.
  Target: All States and the District of Columbia.
  Baseline: 23 States had a graduated driver licensing model law in 1999.
• 15-34. Reduce the rate of physical assault by current or former intimate partners.
  Target: 3.3 physical assaults per 1,000 persons aged 12 years and older.
  Baseline: 4.4 physical assaults per 1,000 persons aged 12 years and older by current or former intimate partners occurred in 1998.
• 18-2. Reduce the rate of suicide attempts by adolescents.
  Target: 12-month average of 1 percent.
  Baseline: 12-month average of 2.6 percent of adolescents in grades 9 through 12 attempted suicide in 1999.

It is the task of public health professionals and public health agencies to make the argument for devoting collective attention and resources to injury prevention. What is that argument? It consists of two key points. First, the scope, magnitude, and medical and social costs of injury should make injury and injury prevention leading public health concerns. Second, injury is indeed highly preventable and preventable in ways that are understandable and achievable.

Because injuries are not unpredictable, unavoidable events, society to a large extent chooses the injury rates it has. For example, it is a societal choice to rely predominantly on automobiles and trucks to move people and goods and to do so at high speeds, despite the highly predictable injuries that will result. Similarly, it is a societal choice to allow firearms to be readily accessible without any of the types of safety regulations applied to all other consumer products. And it is a societal choice as to what level of protection—governmental and voluntary—should be provided for worker safety.

Public health professionals can help guide these social choices by providing clear, science-based information on the effectiveness of various interventions, so what is known to work can be put into action. Injury prevention professionals can also help counter misconceptions and objections that often serve as barriers to effective injury prevention efforts.
These include such erroneous ideas as that motorcycle helmet use increases crash events, that the US Constitution doesn’t allow restrictions on gun possession, or that the decision not to wear a seat belt affects only the individual making that decision.8

Public health professionals have a clear and important role in helping to reduce injury. It is a role that requires an understanding of the facts surrounding the injury problem. Let us therefore begin by looking more closely at the magnitude, costs, and preventability of injury to better understand why injury deserves major emphasis as a public health problem.

### MAGNITUDE

The scope of the problem is impressive and concerning. As Baker et al have noted:

Injury is important not only in relation to other health conditions but also in the absolute magnitude of the problem. More than six million people alive today in the United States can be expected to die from injuries. . . . The risk of injury while traveling, working, playing, or even sleeping is so great that most people sustain a significant injury at some time during their lives. Few escape the tragedy of a fatal or permanently disabling injury to a relative or friend.9

Injuries are the leading cause of death in the United States up to age 44 years. For Americans between the ages of 10 and 34 years, injuries (unintentional and intentional) account for more deaths than all other causes of death combined.10 Overall, injury ranks fourth among causes of death.11 Unlike heart disease and cancer, which primarily affect the old, injury deaths affect people of all ages, especially the young. “Injuries are the leading cause of death in the United States among children and teenagers. During [the 20th] century, trauma . . . replaced infectious disease as the most important threat to our children.”12 In 2001, close to three quarters of all deaths among 15- to 24-year-olds were due to injuries, as were almost half of all deaths of 5- to 14-year-olds.13 Even for the elderly, despite their higher rates for heart disease and cancer, the death rate from injury remains higher than it is for young people. Persons 75 years of age and older had the highest injury death rates.14

Injuries result in more productive years of life lost than any other cause: about three-and-one-third million potential years of life lost prematurely each year as compared with less than 2 million for cancer, 1.4 million for heart disease, and between one-quarter and one-third of a million each for HIV, stroke, and liver disease.15 (See Fig. I-1.)

As discussed in later chapters—particularly Chapter 12: Injury Surveillance—most injury data consists of mortality data. It is much harder to collect reliable information on nonfatal injuries—i.e., morbid-
ity—and on the severity of injuries. However, it is clear that fatal injuries are only the tip of the iceberg. (Although we tend to focus on deaths for obvious reasons, this skews the discussion toward the tip of the iceberg, even though public health may well have its principal impact in reducing the much greater numbers of nonfatal injuries. See Figure 1-1.)

The medical care system provides a major source of data on nonfatal injuries. The impact of injury on the nation’s health care resources is indeed dramatic. In 2002, close to 2 million hospital discharges were related to the treatment of injury.16 Injury has long been a leading cause of physician contacts. In 2002, there were 99.2 million injury-related visits to office-based physicians, 10.2 million injury-related visits to hospital outpatient departments, and 37.8 million injury-related visits to hospital

![Figure 1-1](image-url)
emergency departments. As the Committee for Injury Prevention and Control explained:

Although most nonfatal injuries are of minor severity and do not result in more than one or two days of restricted activity, a large number result in fractures, brain injuries, major burns, or other significant disability. In 1992–1994, the average hospital discharge rates for fractures which account for nearly 2 out of 5 injury-related discharges was 39.3 per 10,000 persons. During this same period, the other leading injury-related discharge diagnoses were poisonings, open wounds and lacerations, intracranial injuries, and sprains and strains. These accounted for 25 percent of first-listed injury hospital discharges. Fractures typically required six to seven days of hospitalization, whereas the other diagnoses, on average, required three to four days of hospitalization.

Injury rates and causes vary according to age, sex, race, income, and geography. Motor vehicles and firearms are the most likely causal agents to be involved in injury deaths for the young, while falls are the most common cause of fatal injuries for the old. Injury death rates are highest for the very old, reflecting their much higher overall death rate. Prior to that the highest injury death rates are for those between 15 and 24 years of age. Injury death rates are also higher for males than for females for many injuries. Race also has an impact. The injury rate for black Americans is higher than that for nearly all other racial and ethnic groups, and American Indians and Alaska Natives are among those at highest risk for residential fire injuries. These racial differences reflect dramatic differences in death rates based on economic class. “For unintentional injuries, the death rate varies inversely with per capita income. . . . For suicide, there is little relationship between death rate and per capita income; for homicide, residents of the wealthiest areas have much lower rates than those in other areas.” Unintentional injury death rates are highest in rural areas, while homicide rates are highest in urban central city areas.

A discussion of the magnitude of injury should not end without saying something about long-term trends. As discussed above, the bad news is that injury is a leading public health problem resulting in serious morbidity and mortality. The good news is that in many ways the picture is improving. Although have been some exceptions, such as an increasing number of poisoning deaths, by and large there has been improvement. During the 1990s, progress was made in unintentional injury hospitalizations, residential fire deaths, nonfatal head injuries, spinal cord injuries, nonfatal poisonings, pedestrian deaths, homicides, suicides, weapon carrying by adolescents, conflict resolution in schools, and child death review systems. To a lesser degree, there was also progress made regarding unintentional injury deaths, motor vehicle deaths, motor vehicle oc-
cupant protection systems, helmet use by motorcyclists and bicyclists, safety belt use laws, alcohol-related motor vehicle deaths, drownings, firearm-related deaths, partner abuse, rape and attempted rape, physical fighting among adolescents aged 14 to 17 years, and the number of states with firearm storage laws. A review of 2002 data by the National Center for Health Statistics (NCHS) found that:

Among the Nation’s leading causes of death, there were declines in mortality from heart disease (3 percent), stroke (nearly 3 percent), accidents/unintentional injuries (nearly 2 percent), and cancer (1 percent). The biggest decline in mortality among the leading cause of deaths was for homicides—down 17 percent. That number had increased sharply in 2001 due to the September 11th terrorist attacks. Excluding the September 11th deaths, the decrease from 2001 to 2002 would have been 3 percent, which still reflects a continuing downward trend in homicides that began in 1991.

COSTS

The economic costs to society resulting from injury are high. Estimates compiled by The Institute of Medicine’s Committee on Injury Prevention and Control indicate that the costs of injury are higher than those of any other health problem, roughly equal to the costs associated with heart disease (second most costly) and cancer (third most costly) combined. In terms of direct health care delivery costs only, injury is second only to cardiovascular disease.

Measuring the overall cost of injury is not easy. Some costs are measurable, some are not. Some costs are monetizable, some are not. Deaths and hospital admissions, for example, are more readily measured than are lost future wages or the costs associated with permanent disfigurement. And as Fingerhut and Warner point out, “some very large number of injuries are not part of any data system because they were not medically treated and thus impose an unmeasured burden on society.” We also know that injury, especially sudden traumatic deaths from firearms or motor vehicle crashes, have social and psychological costs affecting the victims, the victims’ families, and society as a whole.

Currently available cost information is considerably dated. There is a more extensive literature on the cost of infectious disease than there is on injury costs. The classic injury cost study, Cost of Injury in the United States, was a report to Congress published in 1989. That report noted that:

The direct cost [$157.6 billion, or $2,772 per injured person, in 1985] is only the beginning. Disability from injury results in loss of output. Taking into account members of the labor force, housekeepers, and others unable to attend to their usual activities, more
than 5 million life years are lost, 9 years per 100 injured persons, valued at $64.9 billion. The morbidity cost amounts to $1,145 per injured person.

Other losses result from premature injury fatalities. Approximately 143,000 premature deaths from injury occurred in 1985 and an additional 13,000 deaths occurred in later years due to injury sustained in 1985. Premature death due to injury is extremely costly to the nation, amounting to an estimated annual loss of 5.3 million life years, or 34 years per death. The loss to the economy amounts to $47.9 billion at a 6 percent discount rate, or $307,636 per death.28

This Report to Congress can now be seen as itself an underestimate of injury costs. By the mid-1990s, the estimated cost of injury had risen. According to Healthy People 2010, “In 1995, the cost of injury and violence in the United States was estimated at more than $224 billion per year. These costs include direct medical care and rehabilitation as well as productivity losses to the Nation’s workforce. The total societal cost of motor vehicle crashes alone exceeds $150 billion annually.”29

In the Injury Fact Book 2001–2002, the NCIPC reports that:

- In 1988, the costs of injury were estimated at $182 billion. Inflated to 1995 dollars, costs approach $260 billion.
- Treatment of injuries and their long-term effects account for 12% of medical care spending, totaling $69 billion (in 1993 dollars).
- Federal, state, and local government funds cover 28% of medical expenditures for injury. Private sources cover the remaining 72%.
- In 1985, the federal government paid $8.9 billion for medical care of injured persons, mainly through Medicare and Medicaid. It also paid $14.2 billion in disability and survivor benefits through the Social Security Disability Insurance, Supplemental Security Income, and the Veterans Administration.30

Injury economist Ted Miller provides an even higher estimate: $325 billion (in 1995 dollars) spent on injury and its consequences (including medical costs, work lost, and insurance claims processing expenses).31 Zaloshnja et al estimate expenditures in 1998 of $217 billion for unintentional home injuries alone.32 Also, the 2000 Medical Expenditure Panel Survey estimates expenditures of $117 billion in 2000 for medical expenditures alone.33

The cost figures are so staggering that they may be held in disbelief and result in numbness on the part of policymakers. Yet injury holds important implications for the future of health care (as well as health care insurance coverage) in the United States. With such a significant portion of health care services being devoted to dealing with the results of injury, it is apparent that the health care industry must either join in efforts to reduce the number and the severity of injuries or pass the problem on in the
form of even more expensive health insurance premiums. It should also be noted that injuries disproportionately affect the poor and the uninsured for many specific causes of injury, such as firearm and motorcycle injuries. The costs of dealing with these injuries are passed on to the public.

The bottom line is simultaneously muddy and stark. We do not have any clear, comprehensive, consistent, definitive annual cost of injury total, but all the evidence we do have makes it clear that this total is very, very big and makes a considerable contribution to rising health care costs, especially for the uninsured.

## Preventability

Fred Rivara points out that injury deaths have declined substantially over the course of the 20th century, “although the decrease is far less than that for infectious diseases.” He attributes the decline to three factors:

The first, and in some ways the most important in industrialized countries, has been a general reduction in the exposure to injury hazards as a byproduct of changes in occupations, safer transportation, better housing and heating, and many other factors that accompanied industrialization. . . . The second factor accounting for the change in injury mortality is more recent: reduction in the risk of dying once injured due to improved medical and surgical care. . . . The third reason for the reduction in injury mortality has been the increasing use of injury control strategies that are based on scientific evidence of their effectiveness.

Former CDC Director Dr. William Foege argues that “Injury is a problem that can be diminished considerably if adequate attention and support are directed to it. Exciting opportunities to understand and prevent injuries and to reduce their effects are at hand.”

Yet there exists a wide disparity between what is known about injury prevention and what is actually done to prevent injury. This disparity is greater than with any other major health problem area, including human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS). Thus, although the grim injury picture shows some signs of improving in the face of mounting evidence that many, if not most, injuries are not inevitable, the improvement lags far behind where it could be. The challenge is to close the gap between knowledge and action as effectively as possible. This is where the time-tested tools of public health can come into play.

If injuries are viewed as “accidental”—random, unpredictable, and unavoidable occurrences—or as events resulting from individual carelessness, then there is little reason or opportunity for societal interventions. Instead, injuries would be isolated problems of individual victims, not
public concerns. Until recently this was the conventional outlook. The prevention efforts that did exist focused on the supposed shortcomings of the victims, and interventions were almost entirely aimed at modifying the individual.

During the past three decades, the science of injury prevention has moved away from such a highly individualistic approach to one that relies more on socially-based policies. There are a variety of reasons for this change, including the fact that injury prevention has drawn the attention of a continually broadening range of disciplines. This interdisciplinary collaboration has fostered a number of significant conceptual advances. Epidemiologic studies have altered the overall picture of injury, shifting it from a single-cause view toward a multiple-causation model. There has been growing recognition of the fact that the public health tools and methods used effectively against infectious and other diseases can also be applied to injury prevention. As a result, attention is being paid not only to individual victims, but also to the environment and to the products used by the public.

This is where public health comes into play, by offering the tools and expertise that can effectively organize preventive interventions. These things do not happen by themselves. As Baker et al have noted, “Sometimes people in positions to make changes that could reduce injury risks do not know that effective remedies are available, or they are unaware of their power to implement or promote them.” Implementation requires

- assessing the specific injury problem via data collection and risk factor identification
- facilitating the formation of multidisciplinary groups in the community to coalesce around the problem
- developing injury prevention interventions
- evaluating these early injury prevention programs
- replicating proven programs

One version of this process has been graphically portrayed by the NCIPC. Its representation of the “public health approach” appears as Exhibit 1-3.

Public health can bring the approach outlined in *The Future of Public Health*—assessment, policy development, and assurance—to injury prevention. *Assessment* requires that “every public health agency regularly and systematically collect, assemble, analyze, and make available information on the health of the community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems.” *Policy development* requires that “every public health agency exercise its responsibility to serve the public interest in the development of comprehensive public health policies by promoting use of the scientific knowledge base in decision-making about public health and by leading in developing public health policy.” And *assurance* requires that
“public health agencies assure their constituents that services necessary to achieve agreed upon goals are provided, either by encouraging actions by other entities (private or public sector), by requiring such action through regulation, or by providing services directly.”

How can this approach be organized? One useful blueprint can be found in *Injury Prevention: Meeting the Challenge*, a collaboration of more than 30 injury prevention experts and three federal agencies. This report, to which the reader is referred for useful advice and examples, underscores the theme that injury occurrences are understandable, predictable, and preventable. The *Meeting the Challenge* report concludes that “Were we to apply the lessons of the science of injury prevention in a truly comprehensive way, we would see an enormous reduction in death, disability, and cost to individuals, government, and the private sector . . .

Public health can contribute to reducing injury in the United States by drawing on expertise in advocacy, surveillance, data analysis, research, training, needs assessment, public education, and intervention. These are some of the key areas of expertise that federal agencies—like the NCIPC and the Maternal and Child Health Bureau—have tried to foster through their grant funding mechanisms, either through those specific to injury prevention or through the state formula grant process.

Misinformation and misunderstanding regarding any public health problem needs to be overcome. Ignorance should not deter public health practitioners and public health agencies from dealing with the problem of injury in a rational manner. In fact, it is the task of those charged with
protecting the public’s health to bring about the perceptional changes necessary in order for society to respond adequately to injury as a social problem of significant magnitude.

HIV/AIDS prevention has a constituency of advocates. There are also associations concerned with many chronic and infectious diseases (such as breast cancer, heart, lung, kidney, and diabetes associations) that are able to capture the attention of the public and policymakers for the resources needed to seek solutions, cures, and services. But although there are victims groups for specific subgroups of injury, with a focus on after-injury service provision, and there are groups that focus on selected parts of the injury problem—such as childhood injuries or drunk driving injuries—there is no overall advocacy group to focus public attention on all of injury prevention. Public health practitioners involved in injury prevention must therefore play this role, raising awareness about injuries and their prevention, mobilizing the support of communities and policymakers, and fostering collaborative efforts with those disciplines with a history of working to make safety an issue. Public health practitioners must also highlight the need for training in injury prevention. They must assure that existing injury data, albeit imperfect, is actively made use of to drive and guide programs and policies, rather than waiting for the perfect data set before resources are directed at injury problems. And finally, they must package the data in an effective manner and do not outreach to target audiences.

**CONCLUSION**

Injuries have always been with us, although over time the nature of the leading types of injury has changed. In the United States today, with a heavy reliance on the automobile, it is certainly not surprising that motor vehicle injuries predominate. Nor should it be surprising that in the United States, where handguns are so unusually plentiful and accessible, firearm death rates are tragically high.

The significance of injury as a public health problem has received increasing attention during recent years. This is particularly dramatic when it comes to children, for whom injury is today the leading cause of death. Fortunately, the conceptual approach to injury is becoming less fatalistic and more scientific. There has been progress—albeit slow progress—in reducing the imbalance between the significance of injury as a public health problem and the amount of attention and resources directed at the problem by health departments, research programs, foundations, academia, the private sector, and others. But much remains to be done, especially in public health education and in public health agencies.

Injury continues to be the leading public health problem in the United States. It is a problem of tremendous magnitude in terms of mortality, morbidity, disability, and costs. At the same time, injury is better under-
stood as a highly preventable occurrence. Public health can and should play the critical role in injury prevention. The pages that follow are intended to guide public health practitioners in optimizing their abilities to deal with this important problem and in integrating injury prevention into their work in an effective manner.

NOTES


5. CDC grant award requirement based on the agency’s interpretation of the gun control prohibition contained in The Department of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act, 1997 (emphasis in original).


