Chapter **40**

Interpersonal Violence

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Violence kills more than 1.6 million people each year. The impact of nonfatal violence cannot be quantified, but it is even more pernicious given resultant disabilities and long-term physical, psychological, economic, and social consequences.

The direct and indirect costs of violence are enormous. Violence directly affects health care expenditures worldwide. Indirectly, violence has a negative effect on national and local economies—stunting economic development, increasing economic inequality, eroding human and social capital, and increasing law enforcement expenditures (Waters and others 2004).

The U.S.-based Centers for Disease Control and Prevention identified violence as a leading public health problem in the mid 1980s and early 1990s (Rosenberg 1985; Rosenberg and Fenley 1991), as did the World Health Assembly in 1996 (Resolution WHA49.25). Contributing to the World Health Organization (WHO) report on global violence and health, Dahlberg and Krug (2002) divided violence into the following categories:

- self-directed violence, or violence in which the perpetrator is the victim (for example, suicide)
- interpersonal violence, or violence inflicted by another individual or a small group of individuals
- collective violence, or violence committed by larger groups, such as states, organized political groups, militia groups, and terrorist organizations.

This chapter focuses on interpersonal violence, which disproportionately affects low- and middle-income countries (LMICs).[1] The WHO report on violence and health estimates that more than 90 percent of all violence-related deaths occur in LMIC countries (Dahlberg and Krug 2002). The estimated rate of violent death in LMICs was 32.1 per 100,000 people in 2000, compared with 14.4 per 100,000 in high-income countries.

This chapter is based on a public health approach to preventing interpersonal violence. A public health approach has three overriding characteristics: it applies scientific methodology, emphasizes prevention, and encourages collaboration.

Applying a scientific methodology to a public health approach involves collecting and analyzing data to define the magnitude, scope, and characteristics of the problem, examining the factors that increase or decrease the risk for violence, and identifying the factors that can be modified through interventions. Interventions are designed, tested, and evaluated. Efficacious and promising interventions are implemented, and their effects and cost-effectiveness are evaluated. Ongoing monitoring of intervention effects on risk factors and target problems builds the database to allow quantitative assessment of successes and clear identification of remaining needs.

Fundamentally, public health is focused on prevention of harm caused by disease or violence. Although criminal justice systems have traditionally focused on capturing perpetrators of violence and punishing them for their actions (typically through incarceration), the public health system attempts to prevent violence from occurring and concentrates on identifying ways to keep people from committing acts of violence. Interventions may eliminate or reduce the underlying risk factors and shore up protective factors. Prevention strategies are conceived and implemented with reference to the interaction of risk factors among people at different stages of the life cycle (Mercy and Hammond 1999; additional sources online).

A public health approach must be collaborative, drawing on contributions from different sectors and disciplines. Public health analyses of violence aim to encourage integrated actions by diverse sectors such as health, education, social services, and justice. Each sector has a role to play, and collectively their actions have the potential to reduce violence.

THE NATURE, BURDEN, AND CAUSES OF INTERPERSONAL VIOLENCE

WHO (WHO Global Consultation on Violence and Health 1996, 2–3) defines *violence* as follows: "The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation." This definition emphasizes that, for the act to be classified as violence, a person or group must intend to use force or power against another person. Thus, violence is distinguished from unintended incidents that result in injury or harm.

The nature or mode of violence may be physical, sexual, or psychological, or it may involve deprivation and neglect. Given the difficulties of measuring deprivation and neglect, this chapter concentrates on the physical, sexual, and psychological modes.

Acts of interpersonal violence are classified as family violence or community violence. Family violence is further categorized by victim: child, intimate partner, or elder. *Child abuse,* as defined by WHO (1999, 15), is "physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development, or dignity in the context of a relationship of responsibility, trust, or power." Behavior within an intimate relationship that causes physical, psychological, or sexual harm is typically labeled *intimate partner violence* or *domestic violence. Elder abuse* is mistreatment of older people, generally those older than age 60 or 65, in the home or in an institutional setting.

Community violence is categorized by two types of perpetrators: acquaintances and strangers. It includes sexual assault by strangers and violence in institutional environments, such as residential care facilities, jails, workplaces, and schools. Youth violence, with perpetrators and victims typically 10 to 29 years of age, is also a form of community violence.

Outcomes of Interpersonal Violence

Identifying the outcomes of interpersonal violence helps to determine the magnitude of the problem.

Data. As noted earlier, a fundamental aspect of the public health approach is the collection of accurate information, such as demographic characteristics of victims and perpetrators, weapon involvement, settings in which violence occurs, situational determinants, and nature and severity of resultant injuries and other harm. Data sources include death certificates, vital statistics records, medical examiners' reports, hospital and other medical records, police and judiciary records, and self-reported information from victim surveys and special studies. Multiple data sources, with their inherent strengths and limitations, are essential.

The most widely encountered sources of information are from the health and criminal justice sectors. Reliable data on violent deaths are not routinely collected in most countries. Where data collection systems are in place, coroner and mortuary reports, death certificates, and vital statistics records usually provide additional data about the victim. The health sector typically documents characteristics of the decedent and the cause, location, circumstances, and time of death. The criminal justice sector documents deaths or arrests resulting from interpersonal violence, including sometimes recording information about the relationship between the victim and the offender, the circumstances surrounding the violence, and the demographics of the perpetrator.

Theoretically, health and criminal justice sector data include information about nonfatal violence at all levels of severity, including threats of violence and instances of psychological violence, deprivation, and neglect. In practice, however, only data about violence-related injuries presenting at hospital emergency departments are collected. Studies from a variety of countries show that for every victim reporting violence to the police, at least two more present only at health agencies (Houry and others 1999; Kruger and others 1998; Sutherland, Sivarajasingam, and Shepherd 2002; additional sources online). Victims of nonfatal violence treated by the health sector may provide information about the perpetrator-victim relationship, about the circumstances surrounding the attack, and about contextual and developmental risk factors. However, the health sector is frequently restricted in recording information about perpetrators.

In LMICs, population-based surveys are a more useful source of information about violence-related injuries at all severity levels (Sethi, Habibula, and others 2004). Such surveys have been conducted in Bangladesh (Rahman, Andersson, and Svanstrom 1998); Colombia (Duque, Klevens, and Ramirez 2003); Iraq (Roberts and others 2004); Pakistan (Ghaffar 2001); South Africa (Butchart, Kruger, and Lekoba 2000; additional sources online); and Uganda (Kobusingye, Guwatudde, and Lett 2001). Demographic and health surveys with questions about violent victimization also collect information about the relationship between violence and other health conditions, but they can provide only limited insight into the perpetrators.

Hospital emergency departments have been used in some postconflict settings to monitor weapons-related injuries and evaluate the relative contributions of collective and interpersonal violence to the caseload (Meddings and

O'Connor 1999; Michael and others 1999). Some developing countries, such as Bangladesh, Kenya, and Uganda, also use violence and injury surveillance systems based in health facilities to monitor hospitalizations resulting from violence and other causes of injury (Kobusingye and Lett 2000; Odero and Kibosia 1995; Rahman and others 2001). Where emergency and forensic medical services are reasonably well developed and where access to such services is equitable, violence and injury surveillance tools have been integrated into hospital emergency departments (Hasbrouck and others 2002; additional sources online), prenatal clinics (Dunkle and others 2004), forensic service centers for rape victims (Swart and others 2000), and mortuaries (Butchart and others 2001). Those efforts have proven effective in obtaining victim-based, descriptive epidemiological information and insights into the relationships between victims and perpetrators.

Deaths Resulting from Interpersonal Violence. Global burden of disease estimates indicate that, in 2001, approximately 1.6 million people died as a result of violence. Of those deaths, 34 percent were due to interpersonal violence (table 40.1).

Rates and patterns of violent death vary by country and region (figure 40.1). Homicide rates were highest in developing countries in Sub-Saharan Africa and Latin America and the Caribbean and lowest in East Asia, the western Pacific, and some countries in northern Africa. Studies show a strong, inverse relationship between homicide rates and both economic development and economic equality (Butchart and Engstrom 2002; Fajnzylber, Lederman, and Loayza 2000). Poorer countries, especially those with large gaps between the rich and the poor, tend to have higher rates of homicide than wealthier countries.

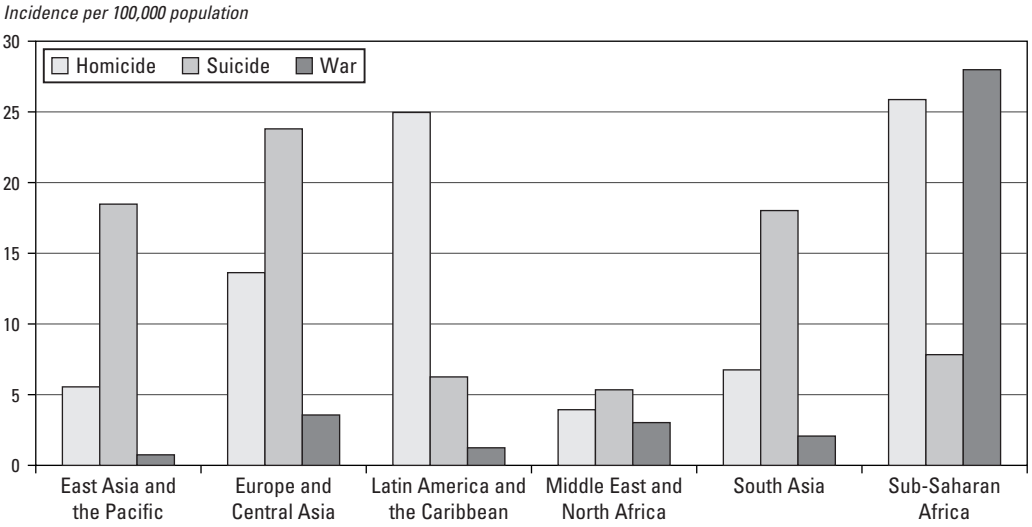
Table 40.1 Estimated Violence-Related Deaths, by Type and Region, 2001

Category	Number[a]	Rate per 100,000 population[b]	Proportion of total (percent)
Suicide	875,000	15.2	53.3
Homicide	557,000	9.3	34.0
War-related fatality	208,000	3.5	12.7
Total	1,640,000	28.0	100.0
LMICs	1,489,000	31.0	90.8
High-income countries	150,000	14.3	9.2

Source: Lopez and others 2006.
a. Rounded to the nearest thousand.
b. Age standardized.

Homicide rates differ markedly by age and sex (table 40.2). Gender differences were least marked for children. For the 15 to 29 age group, male rates were nearly six times those for female rates; for the remaining age groups, male rates were from two to four times those for females. Female homicide rates doubled after age 14 and gradually but steadily increased with age, and male rates increased more than 14 times after age 14, peaked in the 15 to 29 age group, and then gradually decreased with age. Overall, homicides resulted in the deaths of 3.4 males per female.

Violence-Related Burden of Disease. The sum of years of potential life lost because of premature mortality and years of productive life lost because of disability is not a particularly useful measure of the burden of violence. Disability-adjusted life years rely, in part, on estimates of nonfatal events. In the case of violence, those estimates are restricted to injuries and



Source: Lopez and others 2006.

Figure 40.1 Homicide, Suicide, and War-Related Fatality Rates, by Region, 2001

Table 40.2 Estimated Global Homicide and Suicide Rates, by Age Group, 2001
(number per 100,000 population)

	Homicides		Suicides	
Age	Males	Females	Males	Females
0–4 years	2.1	2.0	0.0	0.0
5–14 years	1.6	1.5	1.4	1.1
15–29 years	23.1	3.9	18.9	13.2
30–44 years	20.9	4.7	22.9	13.0
45–59 years	16.5	5.0	29.0	15.8
60+ years	12.6	5.4	41.7	20.8
Total	14.3	3.7	17.7	10.7

Source: Lopez and others 2006.

physical disabilities, both markedly underreported. In addition, given that psychological and other noninjury health consequences of violence are substantial, failure to include them in the measurement of disability-adjusted life years means that estimates of the nonfatal burden of violence may be grossly underestimated.

Violence-related morbidity can be analyzed as four distinct, but often co-occurring, outcome clusters: injuries and disabilities, mental health and behavioral consequences, reproductive health consequences, and other health consequences.

Studies in a number of countries show that, for every homicide among young people age 10 to 24, 20 to 40 other young people receive hospital treatment for a violent injury (Mercy and others 2002). Injuries range from minor, which can be self-treated, to severe. Severe injuries are those that may require resource-intensive emergency medical treatment and inpatient care and may result in lifelong disabilities, such as amputations, brain damage, or paraplegia. Few countries have information systems for monitoring nonfatal violent injuries, and existing systems typically record only data on violent injuries presenting at hospital emergency departments. Data from those sites cannot be directly compared, given the marked differences between and within countries in the availability and accessibility of emergency medical services.

The mental health consequences of violence are far reaching. Child abuse has well-documented sequelae of psychiatric disorders and suicidal behaviors (Runyan and others 2002). Both short- and long-term sequelae have been demonstrated (Mercy and others 2002, Heise and Garcia-Moreno 2002), including depression, anxiety disorders, substance abuse disorders, aggression, cognitive problems, sleep disorders, and posttraumatic stress disorder. The severity and duration of those consequences vary with the child's age and the length of time the child suffers the abuse, as well as the duration and intensity of the abuse, the child's relationship to the abuser, and the treatment received (Runyan and others 2002).

Intimate partner violence results in an increased incidence of suicide and suicide attempts, as well as in depression, anxiety, and phobias (Heise and Garcia-Moreno 2002). Additional consequences include substance abuse, eating and sleep disorders, poor self-esteem, posttraumatic stress disorder, psychosomatic disorders, and risky sexual behaviors. Sexual assault results in consequences that can be long lasting and severe, including posttraumatic stress disorder, depression, and conduct disorders, as well as sleep and eating disorders (Jewkes, Sen, and Garcia-Moreno 2002).

According to Jewkes, Sen, and Garcia-Moreno (2002), among adolescents and women age 12 to 45, the frequency of pregnancy as a result of rape varies from 5 to 18 percent. In addition, younger rape victims often have an increased rate of later, unintended pregnancies. Rape frequently results in gynecological problems, problems of sexual functioning, and sexually transmitted diseases, including HIV infection. HIV infection and the stigma it carries put both female and male victims of sexual assault at increased risk of further violence. A similar range of reproductive health consequences may also follow intimate partner violence.

A strong, graded relationship exists between the breadth of exposure to abuse or household dysfunction during childhood and the presence of adult diseases, including ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease (Felitti and others 1998). In developed countries, abuse and other violent events of childhood have been associated with a 4- to 12-fold increased risk for alcoholism, drug abuse, depression, and suicide attempt; a 2- to 4-fold increased risk for smoking, poor self-rated health, 50 or more sexual intercourse partners, and sexually transmitted disease; and a 1.4- to 1.6-fold increased risk for physical inactivity and severe obesity (Anda and others 1999; Dietz and others 1999; Dube and others 2001, 2002; Hillis and others 2000, 2001; Williamson and others 2002). Similar exposures to violence in developing countries may have different, yet equally wide-ranging, impacts beyond direct physical and psychological injuries.

Data on Violence in Developing Countries

Studies documenting the human and economic toll of violence in LMICs are strikingly scarce. In addition to disparate levels of economic development, other differences between countries strongly influence levels and patterns of interpersonal violence and the toll that such violence takes on society. Countries with weak governments and institutions are at considerably higher risk for interpersonal violence than countries with developed institutions, and countries at war are likewise at higher risk than countries at peace. The same factors that lead to high levels of interpersonal violence—lack of economic development; weak social, political, and judicial institutions; social disturbances; and warfare—also adversely affect nations' ability to collect data and to address the causes or consequences of this violence.

Table 40.3 Risk Factors for Becoming a Victim or Perpetrator of Violence

Level of the ecological model	Risk factors
Individual (biological and personal history factors that influence how individuals behave)	Early developmental experience
	Demographic characteristics (for example, age, education, family, or personal income)
	Victim of child abuse and neglect
	Psychological and personality disorders
	Physical health and disabilities
	Alcohol or substance abuse problems
	History of violent behavior
	Youth
	Male
	Gun ownership
Relationship (with family members, friends, intimate partners, peers)	Marital conflicts around gender roles and resources
	Association with friends who engage in violent or delinquent behavior
	Poor parenting practices
	Parental conflict involving use of violence
	Low socioeconomic status of household
Community (neighborhoods, schools, workplaces)	High residential mobility
	High unemployment
	High population density
	Social isolation
	Proximity to drug trade
	Inadequate victim care services
	Poverty
	Weak policies and programs in, for example, workplaces, schools, residential care facilities
Societal (broad factors that reduce inhibitions against violence)	Rapid social change
	Economic inequality
	Gender inequality
	Policies that create and sustain or increase economic and social inequalities
	Norms that give priority to parents' rights over child welfare
	Norms that entrench male dominance over women
	Poverty
	Weak economic safety nets
	Poor rule of law
	Poor criminal justice system that supports the use of excessive violence by police officers against citizens and leaves perpetrators immune from prosecution
	Social or cultural norms that support violence
	Availability of means (for example, firearms)
	Conflict or postconflict situation

Source: Krug and others 2002a.

Risk Factors for Understanding Violence

Risk factors for violence are conditions that increase the possibility of becoming a victim or perpetrator of violence. No single factor explains why a person or group is at a high or low risk of violence. Rather, violence is an outcome of a complex interaction among many factors. This relationship is captured in an ecological model that classifies risk factors for violence by four levels: individual, relationship, community, and societal (Dahlberg and Krug 2002). Although some risk factors may be unique to a particular type of violence, the various types of violence more commonly share a number of risk factors (table 40.3).

ECONOMIC IMPACT OF VIOLENCE

Violence exacts an extraordinary economic toll.

Costs of Violence

Estimates of the costs of violence vary broadly, with many of the differences resulting from the inclusion or exclusion of different categories. Cost categories can be broadly grouped into direct costs, which result directly from acts of violence or attempts to prevent them, and indirect costs, which include the opportunity cost of time, lost productivity, and impaired quality of life.

Those and other methodological issues lead to differing estimates of the costs of violence.[2] Researchers have calculated the value of a human life using lost wages, estimates of the quality of life, wage premiums for risky jobs, willingness to pay for safety measures, and individual behavior related to safety measures. The value of human life used in U.S. studies ranges from US$3.1 million to US$6.8 million (Fisher, Chestnut, and Violette 1989; Viscusi 1993; additional sources online). The rate used to discount future costs and benefits also varies, generally from 2 to 10 percent.[3]

Fromm (2001) reviews a variety of sources and calculates an aggregate total of US$94 billion in annual costs to the U.S. economy resulting from child abuse, which is equal to 1 percent of gross domestic product (GDP). The estimate includes direct medical costs and related costs of legal services, policing, and incarceration, as well as the value of indirect productivity losses, psychological costs, and future criminality. Using secondary sources, Courtney (1999) calculates direct costs of US$14 billion, including counseling and child welfare services, resulting from child abuse in the United States.

The Centers for Disease Control and Prevention (CDC 2003) cite an estimated 5.3 million victimizations involving intimate partner violence each year in the United States among women 18 and older, resulting in nearly 2 million injuries. More than 550,000 of those injuries require medical attention. The costs of intimate partner violence, including medical care, mental health care, and lost productivity, exceed US$5.8 billion annually.

As a percentage of GDP, estimates of the costs of intimate partner violence are considerably higher in LMICs than in high-income countries. Morrison and Orlando (1999) calculate the costs of domestic violence against women on the basis of stratified random samples of women. Using only the lost productive capacity of the women, they extrapolate total costs of US$1.73 billion in Chile and US$32.7 million in Nicaragua. In a subsequent publication, Buvinic and Morrison (1999) calculate that the direct medical costs plus lost productivity are equivalent to 2.0 percent of GDP in Chile and 1.6 percent of GDP in Nicaragua.

Several studies have used the U.S. National Crime Victimization Survey, an annual survey based on 100,000 interviews with crime victims, to estimate the incidence and calculate the direct costs of sexual assault. For example, Miller, Cohen, and Rossman (1993) calculate average psychological costs of US$66,600 for each rape and total costs of US$85,000 for sexual assault resulting in physical injury. Psychological costs, also referred to as "pain and suffering," are considered indirect costs. Because many studies do not include those types of costs, cost estimates vary widely.

Violence at the workplace also extracts an economic toll, but studies of its magnitude are not well developed and are hampered by measurement difficulties and nonstandardized methodologies. Biddle and Hartley (2002) study homicides in the workplace in the United States and calculate an annual cost of approximately US$970 million. An international report commissioned by the International Labour Organization on the costs of violence and stress in work environments estimates that losses from stress and violence at work are equivalent to 1.0 to 3.5 percent of GDP over a range of countries (Hoel, Sparks, and Cooper 2001). All those studies use a broad definition of *workplace violence,* including psychological violence such as sexual harassment and bullying.

Violence committed by juveniles is particularly costly to society. Miller's (2001) analysis of violent crimes committed in Pennsylvania in 1993 finds that juvenile violence accounted for 24.7 percent of all violent crimes and 46.6 percent of total victim costs from violent crime. Cohen (1988) calculates that the total cost to society of a youth engaging in a life of crime ranges from US$1.9 million to US$2.6 million.

Proximate Risk Factors

Alcohol, drugs, and guns contribute to the costs of interpersonal violence. According to estimates by the Children's Safety Network Economics and Insurance Resource Center (1997), the cost of violent crime committed under the influence of alcohol equaled US$33.3 million in 1995, or 8.3 percent of the cost of all violent crime in the United States. The National Crime Prevention Council (1999) estimates that the cost of all drug-related crime, including productivity costs, amounts to US$60 billion to US$100 billion annually in the United States, with violent crime accounting for approximately 10 percent of this figure.

Cook and Ludwig (2000) estimate that the annual costs of gun violence in the United States are on the order of US$100 billion. Miller and Cohen (1997) calculate a significantly higher estimate for the toll of gun-related violence in the United States: US$155 billion (including psychological costs and the value of quality of life). They also calculate that, on a per capita basis, the cost of gun violence in Canada equals one-third of the U.S. cost. Peden and van der Spuy's (1998) study at the Groote Schurr Hospital in Cape Town, South Africa, finds that direct medical costs averaged R 30,628 (US$10,308) per gunshot victim.

Effects on Public Finances

The public sector (and thus society in general) bears many of the costs of interpersonal violence. Several studies (Klein and others 1999; Payne and others 1993; additional sources online) find that 56 to 80 percent of U.S. health care costs for stabbing and gun injuries are either directly paid by public financing or are not paid at all. In the latter case, government and society absorb the costs in the form of uncompensated care financing and overall higher payment rates. In LMICs, society likely also absorbs the costs of violence through direct public expenditures and negative effects on investment and economic growth.

INTERVENTIONS

The evidence base of ways to prevent violence is expanding rapidly, but huge gaps remain in relation to effective strategies for reducing the health burden associated with interpersonal violence. The greatest strides have come in the areas of youth violence and child abuse, and almost all the prevention knowledge has been developed in high-income countries. Despite those limitations, an understanding of the epidemiology and etiology of violence and prevention provides important insights into the spectrum of policies and interventions that can be drawn on to prevent violence in LMICs.

Violence Prevention Strategies

The many commonalities among the various forms of violence in relation to their epidemiology and etiology suggest that common pathways to prevention may be available (Reza, Mercy, and Krug 2001). A typology of prevention strategies is useful in sorting through the complexities and commonalities of this problem to identify the range of strategies that might be incorporated into effective violence prevention plans. We propose a typology of prevention based on two key dimensions: the stages of human development and the ecological model mentioned earlier.

The epidemiology of violence, including its onset, desistance, and continuity, is closely related to the stages of human development (Williams, Guerra, and Elliott 1997). Increasing evidence points to the existence of discrete developmental pathways to violent behavior (Loeber and others 1993; Tolan and Gorman-Smith 1998; U.S. Department of Health and Human Services 2001; additional sources online). Thus, intervening at early developmental stages may reduce the likelihood that violence is expressed during later developmental stages.

The ecological model is also an important dimension of the typology, because violence is the product of multiple and overlapping levels of influence on behavior. The ecological model assumes that violent behavior is influenced by social contexts and the individual attributes brought to these contexts. Intervention may therefore attempt to influence aspects or risk factors at any or all of the model's four levels (Dahlberg and Krug 2002; Mercy and Hammond 1999).

Table 40.4 presents our typology of prevention strategies. The examples presented are not exhaustive, nor have all the strategies proven effective. Rather, they illustrate the breadth of potential solutions and emphasize the need to consider addressing the problem simultaneously at different stages of human development and through different social contexts. In many cases, an intervention might have an effect on multiple forms of violence. At this time, data to prove or disprove the effectiveness of most of these interventions are insufficient, and in those cases in which sufficient data are available, they are almost always from high-income countries.

Strategic Focuses for Prevention

A simple understanding of the approaches illustrated in table 40.4 is insufficient for developing a comprehensive violence prevention strategy. A public health approach to violence prevention concentrates on identifying ways to keep people from committing violent acts. Interventions may eliminate or reduce the underlying risk factors and shore up protective factors. Interventions are typically classified in terms of three levels of prevention: primary, secondary, and tertiary (Dahlberg and Krug 2002).

Primary Prevention. Primary prevention interventions focus on preventing violence before it occurs. The literature has given rise to several strategic focuses for the primary prevention of violence that are important considerations in violence prevention planning. Some have been successfully implemented at the community level in LMICs.

The cultural context plays an important role in violent behavior. Cultural traditions are sometimes used to justify such social practices as female genital mutilation and severe physical punishment of children (Mercy and others 2003). Conversely, cultural norms can be a source of protection against violence, such as traditions that promote the equality of women or respect for the elderly. Although evidence-based approaches for changing cultural traditions as a violence prevention strategy are not yet available, some countries have adopted this strategy. In South Africa, the Soul City health promotion campaign makes residents aware of the extent and consequences of violence and encourages better parenting through role models and improved communication among family members. Evaluations have found shifts in attitudes and social norms concerning intimate partner violence and domestic relations. Willingness to change behavior and take action to stop violence has increased in urban and rural areas among both men and women (Krug and others 2002b,

Table 40.4 Prevention Strategies, by Developmental Stage and Ecological Context

Level of the ecological model	Developmental stage: Infant and toddler years (age birth–3)	Childhood (age 4–11)	Adolescence (age 12–19)	Adulthood (age 20+)
Individual	• Reduction in unintended pregnancies • Access to prenatal and postnatal services • Treatment programs for child witnesses of violence and victims of maltreatment to reduce consequences	• Social development training[a] • Preschool enrichment programs[a] • Drug-resistance education[b] • School-based programs to prevent child maltreatment • Community-based prevention of child sexual abuse • Gun safety training	• Social development training[a] • Drug-resistance education[b] • Educational incentives for at-risk, disadvantaged students[a] • Individual counseling[b] • Supervised exposure to prison and morgue (shock or scare high-risk youth[b]) • Residential programs in psychiatric or correctional institutions[b] • Academic enrichment programs • Gun safety training • Boot camps[b] • Waivers to try in adult court[b] • School-based violence prevention programs[a]	• Incentives for postsecondary education or vocational training • Services for adults abused as children • Treatment for child and intimate partner abuse offenders • Waiting periods for firearm purchases • Owner liability for damage by guns
Relationship	• Home visitation services[a] • Parenting training[a] • Therapeutic foster care	• Parenting training[a] • Mentoring • Partnership programs between homes and schools to promote parental involvement	• Mentoring[a] • Peer mediation and counseling[b] • Temporary foster care programs for serious and chronic delinquents • Family therapy[a]	• Programs to strengthen ties to family • Programs to strengthen ties to jobs • Couples therapy • Relationship education
Community	• Lead monitoring and toxin removal • Screening by health care providers for maltreatment	• Safe havens for children on high-risk routes to and from school • After school programs to extend adult supervision • Recreational programs	• Recreational programs • Multicomponent gang prevention programs[b] • Health care professionals trained in identification and referral of high-risk youth and victims of sexual violence • Community policing • Improvements in emergency response, trauma care, and access to health services • Programs to buy back guns[b] • Metal detectors in schools	• Adult recreation programs • Shelters and crisis centers for battered women and victims of elder abuse • Criminal justice reforms to criminalize child maltreatment, intimate partner violence, and elder abuse • Mandatory arrest policies for intimate partner violence • Public shaming of intimate partner violence offenders • Services for identifying and treating elder abuses • Health care professional training in identification and referral of victims of elder abuse and sexual violence

Table 40.4 Continued

Level of the ecological model	Developmental stage: Infant and toddler years (age birth–3)	Childhood (age 4–11)	Adolescence (age 12–19)	Adulthood (age 20+)
	• Community policing • Emergency response and trauma care improvements • Health care providers trained in the detection and reporting of child maltreatment • Programs to buy back guns[b] • Promotion of safe storage of firearms and other lethal means of inflicting violence • Prevention and education campaigns to increase awareness of child maltreatment • Child protection service programs		• Community policing • Emergency response and trauma care improvements • Programs to buy back guns[b] • Disruption of illegal gun markets • Prohibition of firearm sales to high-risk purchasers • Mandatory sentences for gun use in crimes • Coordinated community interventions for violence prevention • Prevention and education campaigns to increase awareness of youth violence, intimate partner violence, sexual violence, and elder abuse	
Societal	• Promote cultural norms to value and protect life • Promote strength-based cognitive and socio-emotional skills from birth	• Reduce violent content of movies, television, video games, and Internet sites available to children • Launch public information campaigns to promote pro-social norms	• Reduce violent content of movies, television, video games, and Internet sites available to children • Enforce laws prohibiting illegal transfers of guns to youths	• Establish job creation programs for the chronically unemployed
	• Strengthen police and judicial systems • Deconcentrate poverty • Reduce income inequality		• Strengthen police and judicial systems • Promote safe storage of firearms • Deconcentrate poverty • Reduce income inequality • Change cultural norms that support violence and abuse of children and adults	

Source: Authors.
a. These programs have been demonstrated to be effective in reducing violence or risk factors for violence.
b. These programs have been found to be ineffective in reducing violence.

box 9.1). In the Kapchorwa district of Uganda, a community health program has enlisted the support of elders in adopting alternative practices to female genital mutilation that are consistent with their cultural traditions (United Nations Population Fund 1998).

The lethality of interpersonal violence is affected by the means people use to carry out this violence. Reducing access to lethal means, such as firearms, may help minimize the health consequences of violence. A wide variety of strategies have been used to restrict access to firearms, such as mandating waiting periods before purchase, promoting safe storage of firearms, and limiting where firearms can and cannot be carried. In the mid 1990s, Colombian officials in Bogotá and Cali, noting that homicide rates increased during weekends following paydays, on national holidays, and near elections, implemented a ban on carrying handguns during those times, which resulted in a 13 to 14 percent reduction in homicide rates (Villaveces and others 2000). In the Australian state of Victoria, firearm-related suicides, assaults, and unintentional deaths decreased following the 1988 implementation of legislation that required the registration of all firearms and strengthened licensing regulations; a mandatory waiting period was added in 1996 (Ozanne-Smith and others 2004). However, the evidence to determine whether such strategies are effective in reducing firearm-related homicides is currently insufficient (Hahn and others 2003), although several policies hold promise (Hemenway 2004; Ludwig and Cook 2003).

Inadequate parental involvement in children's and adolescents' activities and lack of supervision are well-established risk factors for youth violence (U.S. Department of Health and Human Services 2001). Evidence indicates that a supportive relationship with parents or other adults is protective against antisocial behavior. Although not widely evaluated, some mentoring programs that match high-risk youths with a positive adult role model appear to be effective in reducing youth violence (Grossman and Garry 1997; Thornton and others 2002); however, negative findings have also been reported for mentoring, particularly when mentors receive little training and when

the relationships between adults and youths break down. The design of mentoring programs varies considerably, and participation by both mentors and youths can be uneven.

Programs that target those who influence children are more effective than interventions that target all adults. For example, preschool enrichment, home visitation, and parenting programs have been found to have both short- and long-term effects on preventing violence (Farrington 2003; Mercy and others 2002; Utting 2003; additional sources online). Early intervention can help shape attitudes, knowledge, and behavior of children at a time when they are more open to positive influences and can affect their behavior over their lifetime (Mercy and others 1993).

Income inequality is a risk factor universally associated with interpersonal and collective violence (Butchart and Engstrom 2002; Zwi, Garfield, and Loretti 2002; additional sources online). Poverty itself does not appear to be consistently associated with violence, but the juxtaposition of extreme poverty with extreme wealth appears to be a key ingredient in recipes for violence. Economic programs or policies that reduce or minimize the effects of income inequality may be strategic in violence prevention, although the evidence base for such interventions has not been established.

Secondary and Tertiary Prevention. Although an emphasis on primary prevention is essential for reducing the health burden associated with violence, secondary prevention programs and services are necessary for addressing the immediate consequences of violent actions and behaviors, and tertiary programs focus on long-term care. Efforts targeted at victims of violence are extremely important for mitigating the physical and psychological consequences of the various forms of violence and abuse and for reducing victims' risks for future violence (National Center for Injury Prevention and Control 2002).

Physicians and other health professionals are gatekeepers in efforts to monitor, identify, treat, and intervene in cases of interpersonal violence. As previously noted, more cases of interpersonal violence come to the attention of health care providers than of police. The role of health care providers in prevention efforts is neither widely understood nor embraced, and many institutional and educational barriers limit their effectiveness (Cohen, De Vos, and Newberger 1997). Programs to educate health care providers are under way worldwide. Many hospital emergency departments, doctors' offices, and clinic settings use screening programs to identify victims of intimate partner violence, child abuse, or elder abuse, although the effectiveness of those interventions in reducing subsequent violence is not well understood (Heise and Garcia-Moreno 2002; Runyan and others 2002; Wolf, Daichman, and Bennett 2002).

Therapeutic approaches have been implemented in many parts of the world to reduce child abuse. Though some research suggests that these interventions can improve the mental health of victims, less information is available on other benefits (Runyan and others 2002; additional sources online). One approach to preventing child sexual abuse in the United States challenges social norms by offering help to those at risk of offending and by encouraging adults to watch for and act on warnings of child sexual abuse before an offense is committed (CDC 2001). Under such programs, individuals voluntarily turn themselves in for treatment and thereby prevent potential future violence.

The outcome of injury from interpersonal violence depends not only on its severity, but also on the speed and appropriateness of treatment (Committee on Trauma Research 1985). Establishment of trauma systems designed to treat and manage injured victims efficiently and effectively is an important factor in reducing the health burden of violence. Research suggests that reductions in criminal assaults resulting in death in the United States are partly explained by the increased survival of victims. Developments in medical technology and trauma services may be reducing the number of interpersonal violence fatalities (Harris and others 2002). Hospital emergency departments may also provide an opportunity to intervene with victims who might otherwise seek revenge against their attackers or victims who are at greater risk for revictimization (Muelleman and others 1996).

COST-EFFECTIVENESS OF INTERVENTIONS

Studies show that implementing preventive interventions costs less than dealing with the outcomes of violence, in some cases by several orders of magnitude.

Examples of Cost-Saving Interventions

To date, most evaluations of preventive interventions measure cost and effects in high-income countries. Although cost savings may not be comparable in LMICs, effects may be greater.

Legislation and Shelter for Abused Women. The 1994 Violence against Women Act in the United States has resulted in an estimated net benefit of US$16.4 billion, including US$14.8 billion in averted victims' costs (Clark, Biddle, and Martin 2002). This wide-ranging legislation introduced programs aimed at deterring crimes against women and providing assistance to female victims of crimes. Interventions include penalties for repeat offenders, use of sexual history in criminal and civil cases, programs for victims of child abuse, safe homes for women, confidentiality of the abused person's address, and pretrial detention in sex offense cases. Chanley, Chanley, and Campbell's (2001) analysis shows that providing shelters for victims of domestic violence results in an estimated cost-benefit ratio of 18.4 to 6.8.

Parent Training and Home Visitation. Caldwell (1992) estimates that the costs of child abuse and neglect in Michigan are US$1 billion a year, including the costs of crimes committed by the victims of child abuse later in life and the costs of their incarceration. The study estimates that prevention costs, including a home visitor program for every family and a comprehensive parent education program, are just one-nineteenth of the cost of child abuse. Armstrong's (1983) cost-benefit analysis of a child abuse prevention program in Yeardon, Pennsylvania, finds net savings of US$647,000 per year and a cost-benefit ratio of 1.86.

Registering Firearms. Chapdelaine and Maurice (1996) quantify the costs and benefits of a Canadian law that required gun owners to register their firearms by January 1, 2001. Implementing a universal licensing and registration system cost approximately US$70 million (2001 U.S. dollars), including a significant one-time expense, compared with annual direct health care costs of gun-related violence of US$50 million. When the indirect costs of gun violence are included, the economic benefits of the law are much clearer. Miller (1995) estimates the total costs of firearm-related injuries in Canada at US$5.6 billion, including lost productivity and psychological costs, equivalent to 1 percent of Canada's GDP.

Youth Intervention. Greenwood and others (1996) compare interventions to reduce youth crime in the United States and find that providing high school students with incentives to graduate, which costs US$14,100 per program participant, is the most cost-effective intervention, resulting in an estimated 258 serious crimes prevented per US$1 million spent. Parent training prevents an estimated 157 serious crimes per US$1 million, compared with 72 for delinquent supervision programs and 11 for home visits and day care. All those interventions (excluding home visits) are more cost-effective than California's "three strikes" law, which incarcerates for life those individuals convicted of three serious crimes.

Need for LMIC Cost-Benefit Data

Though violence disproportionately affects LMICs, studies of the economic effects of violence in those countries are scarce. Comparisons with high-income countries are complicated by the tendency to undervalue economic losses related to productivity in lower-income countries, because such losses are typically based on forgone wages and income. Thus, when the costs of violent homicides are calculated, the estimates range from US$15,319 per homicide in South Africa, to US$829,000 in New Zealand, to more than US$2 million in the United States. Given the existing methodological differences and widespread gaps in the literature, systematic research into the costs of violence and the costs versus benefits of prevention efforts is urgently needed.

IMPLEMENTATION OF PREVENTION STRATEGIES

Promoting violence prevention involves encouraging and supporting the development, implementation, and evaluation of programs explicitly designed to stop the perpetration of violence at local, regional, and national levels.

The 2003 World Health Assembly Resolution (WHA56.24) on implementing the recommendations of the *World Report on Violence and Health* (Krug and others 2002b; see also Butchart and others 2004) advocates a five-point strategy.

Increasing Capacity for Collecting and Managing Data

Increased capacity for collecting health, criminal justice, and social service sector data on violence and its consequences is fundamental to building a sustained, high-level policy and intervention programming response in LMICs. Population-level data are needed to design and evaluate community-level intervention trials. Health sector data can cover a larger and often different subset of violence-related injuries than police statistics and, with criminal justice and social service data, can strengthen abilities to define the problem, identify causes and risk factors, design appropriate interventions, and monitor the interventions' effectiveness.

Information systems play a large role in recent efforts to address infectious diseases such as tuberculosis and HIV, allowing better identification of high-risk populations and appropriate interventions. A similar role is imminent for violence prevention. As previously stated, information systems must integrate data from the criminal justice, labor, education, social services, and health sectors and must be linked with systems housed at multilateral agencies or regional joint initiatives. Sharing information regionally allows countries to identify opportunities for collaboration and to share best practices.

Support for Research

Supporting research on the causes, consequences, and prevention of violence has proven effective in mobilizing prevention responses in developing countries. In South Africa, the 1997 Essential National Health Research Conference identified research for improved violence prevention and control as a top priority, and in 2001, the Medical Research Council established a program to give violence prevention research the same priority as research into HIV/AIDS, tuberculosis, and malaria (Jeenah and others 1997; Medical Research Council of South Africa 2004). South Africa also has applied research data in

various prevention contexts, including establishment of a national violence and injury mortality surveillance system, passage of firearms legislation, assessment of national and municipal-level burden-of-disease estimates, and design of prevention programs (Butchart and others 2001; Groenewald and others 2003).

The currently limited evidence base and understanding of the causes of all types of violence must be expanded through planned, documented, evaluated, and shared research. Some developing countries have opportunities to develop and document prevention programs in special settings, such as for refugees, orphans, nomadic, displaced, and homeless populations.

Promoting Primary Prevention

An important first step in promoting primary prevention is systematic documentation of existing prevention programs. Records can include information on the types of violence and risk factors addressed, target populations served, interventions used, and any monitoring and measurement of the effects. Such information can help make the programs more visible to policy makers and development partners and can be used to promote increased investment in programs that apply proven and promising interventions.

WHO has outlined a methodology for systematic documentation (Sethi, Marais, and others 2004, 22–33) and has initiated a project to evaluate the feasibility and utility of such documentation in selected cities and provinces in Brazil, India, Jamaica, Jordan, the former Yugoslav Republic of Macedonia, Mozambique, the Russian Federation, and South Africa.

Strengthening Support Services for Victims

A situational analysis of the accessibility and organization of emergency, acute, long-term, and rehabilitative services can identify needs and help strengthen care and support services for victims of violence. The establishment and adequate funding of first responder systems, such as police and ambulance teams, may lower the costs of violence and contribute to prevention. Maps showing hospitals and clinics with specialized systems for treating victims of violence can help these first responders. Ready access to legal resources empowers victims. Mock and others (2004) offer guidelines for strengthening victim care and support services.

Claramunt and Cortes's (2003) assessment in Belize, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua established baseline information that could be used to advocate for strengthened medical and legal services for victims of sexual violence. Their findings included a lack of adequate medical and legal information systems, the insufficient training of medical staff, and a lack of clear protocols for moving patients through the system. Services in associated sectors—medical, forensic, social, and legal—should be examined, because integrated efforts can improve access to and value of services that previously existed in isolation. Training of medical and legal service providers in activities aimed at preventing violence may also affect the success of long-term prevention; however, this training strategy has not been extensively evaluated.

Developing Action Plans

A national plan of action for preventing interpersonal violence and improving victim support and care is the blueprint that provides a set of common goals, a shared time frame, a strategy for coordinating activities, and a framework for evaluating the different sectors involved. Such a plan is therefore central to organizing national and community-level interventions that involve more than one objective and that depend on input from many different sectors. Strong political support from the highest levels of government is important in aligning the various players and ensuring that the plan is implemented and that associated programs are maintained. Nongovernmental organizations may provide support and continuity in countries where programs may be interrupted because of unstable, changing governments.

Collaboration among national governments and health-related nongovernmental and multilateral organizations can establish the importance of formally addressing violence through public health approaches. Though legal and criminal justice approaches provide a deterrent, experience in high-income countries suggests that a proactive public health approach can reduce the negative health, social, and economic consequences of interpersonal violence.

CONCLUSIONS: PROMISES AND PITFALLS

Violence prevention may be seen as a luxury rather than a public health priority in LMICs; however, the magnitude of the problem and the associated health burden negate this view. Resolutions on violence prevention passed by the World Health Assembly and codified in the *World Report on Violence and Health* and reports from the United Nations Crime Prevention Council present frameworks for approaching violence prevention. The first World Health Assembly resolution was cosponsored by a developing country, South Africa, and a developed country, the United States. Both recognized the importance of making violence prevention a global public health priority even before evidence of effectiveness could be collected. Seven years after the resolution, both developing and developed countries applauded and adopted the *World Report on Violence and Health,* signaling the beginning of an exciting new agenda for public health.

The public health model for violence prevention focuses on primary prevention and intervention for victims and emphasizes the value of integrating efforts across sectors. However, the model is weakened by a paucity of sustained interventions and measured outcomes in LMICs.

Currently, the best approach may be to take small, incremental steps, focusing on relatively discrete and easily implemented interventions that address a prevalent problem. LMICs should build on programs for which some evidence of effectiveness exists in high-income countries and adopt a "learn as you go" approach.

Many LMICs face the daunting challenges of the spreading HIV/AIDS epidemic and ongoing intergroup conflict or war. Those problems can destroy the infrastructure of civil society, increase stress and economic hardship, and lead to increases in suicide and interpersonal violence of all kinds—in both sexes and at all ages. In prioritizing violence prevention efforts, policy makers and health care professionals may mitigate some of the secondary repercussions of these deadly factors.

A great deal of progress has been made in violence prevention. There is strong reason to believe that the interventions under way and the capacity to implement violence prevention will make a difference. The lessons learned to date during the public health community's short experience with violence prevention are consistent with the lessons from the community's much longer experience with the prevention of infectious and chronic diseases. Violence can be prevented in LMICs if their governments, their citizens, and the global community start now, act wisely, and work together.

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NOTES

1. The World Bank (2004) classifies countries by annual gross national income (2001 U.S. dollars) per capita as follows: low-income, US$735 or less; lower-middle-income, US$736 to US$2,935; upper-middle-income, US$2,936 to US$9,075; and high-income, US$9,076 or more.

2. Cost estimates have been converted to 2001 U.S. dollars to facilitate comparisons.

3. Whenever possible, we have cited results calculated using a 3 percent discount rate, as recommended by the U.S. Panel on Cost-Effectiveness in Medicine (Gold, Siegel, and Weinstein 2001).

REFERENCES

Anda, R. F., J. B. Croft, V. J. Felitti, D. Nordenberg, W. H. Giles, D. F. Williamson, and others. 1999. "Adverse Childhood Experiences and Smoking during Adolescence and Adulthood." *Journal of the American Medical Association* 282 (17): 1652–58.

Armstrong, K. A. 1983. "Economic Analysis of a Child Abuse Program." *Child Welfare* 62 (1): 3–13.

Biddle, E., and D. Hartley. 2002. "The Cost of Workplace Homicides in the USA, 1980–1997." Abstract submitted for the World Health Organization's Sixth World Conference on Injury Prevention and Control, Montreal, May 12–15.

Butchart, A., and K. Engstrom. 2002. "Sex- and Age-Specific Effects of Economic Development and Inequality on Homicide Rates in 0 to 24 Year Olds: A Cross-Sectional Analysis." *Bulletin of the World Health Organization* 80: 797–805.

Butchart, A., J. Kruger, and R. Lekoba. 2000. "Perceptions of Injury Causes and Solutions in a Johannesburg Township: Implications for Prevention." *Social Science and Medicine* 50: 331–44.

Butchart, A., M. Peden, R. Matzopoulos, S. Burrows, R. Phillips, N. Bhagwandin, and others. 2001. "The South African National Non-natural Mortality Surveillance System: Rationale, Pilot Results, and Evaluation." *South African Medical Journal* 91 (5): 408–17.

Butchart, A., A. Phinney, P. Check, and A. Villaveces. 2004. *Preventing Violence: A Guide to Implementing the Recommendations of the* World Report on Violence and Health. Geneva: Department of Injuries and Violence Prevention, World Health Organization.

Buvinic M., and A. Morrison. 1999. *Violence as an Obstacle to Development.* 1–8. Washington, DC: Inter-American Development Bank.

Caldwell, R. A. 1992. *The Costs of Child Abuse vs. Child Abuse Prevention: Michigan's Experience.* East Lansing: Michigan Children's Trust Fund.

CDC (Centers for Disease Control and Prevention). 2001. "Evaluation of a Child Sexual Abuse Prevention Program: Vermont, 1995–1997." *Morbidity and Mortality Weekly Report* 50 (5): 77–78, 87.

———. 2003. *Costs of Intimate Partner Violence against Women in the United States.* Atlanta: National Center for Injury Prevention and Control.

Chanley, S. A., J. J. Chanley, and H. E. Campbell. 2001. "Providing Refuge: The Value of Domestic Violence Shelter Services." *American Review of Public Administration* 31: 393–413.

Chapdelaine, A., and P. Maurice. 1996. "Firearms Injury Prevention and Gun Control in Canada." *Canadian Medical Association Journal* 155 (9): 1285–89.

Children's Safety Network Economics and Insurance Resource Center. 1997. *Cost of Violent Crime and of Alcohol-Involved and Drug-Involved Violent Crime in the USA, 1995.* Landover, MD: National Public Services Research Institute.

Claramunt, M. C., and M. V. Cortes. 2003. *Situación de los services medico-legales y de salud para victimas de violencia sexual en Centroamérica.* Serie genero y salud publica 14. San José, Costa Rica: Pan-American Health Organization.

Clark, K. A., A. K. Biddle, and S. L. Martin. 2002. "A Cost-Benefit Analysis of the Violence against Women Act of 1994." *Violence against Women* 8 (4): 417–28.

Cohen, M. A. 1988. "The Monetary Value of Saving a High-Risk Youth." *Journal of Quantitative Criminology* 14 (1): 5–33.

Cohen, S., E. De Vos, and E. Newberger. 1997. "Barriers to Physician Identification and Treatment of Family Violence: Lessons from Five Communities." *Academic Medicine* 72 (Suppl. 1): S19–25.

Committee on Trauma Research, National Research Council, Institute of Medicine. 1985. *Injury in America: A Continuing Public Health Problem.* Washington, DC: National Academy Press.

Cook, P. J., and J. Ludwig. 2000. *Gun Violence: The Real Costs.* New York: Oxford University Press.

Courtney, M. E. 1999. "National Call to Action: Working toward the Elimination of Child Maltreatment. The Economics." *Child Abuse and Neglect* 23 (10): 975–86.

Dahlberg, L. L., and E. G. Krug. 2002. "Violence: A Global Public Health Problem." In *World Report on Violence and Health,* ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 1–21. Geneva: World Health Organization.

Dietz, P. M., A. M. Spitz, R. F. Anda, D. F. Williamson, P. M. McMahon, J. S. Santelli, and others. 1999. "Unintended Pregnancy among Adult Women Exposed to Abuse or Household Dysfunction during Their Childhood." *Journal of the American Medical Association* 282: 1359–64.

Dube, S. R., R. F. Anda, V. J. Felitti, D. P. Chapman, D. F. Williamson, and W. H. Giles. 2001. "Childhood Abuse, Household Dysfunction, and the Risk of Attempted Suicide throughout the Life Span: Findings from the Adverse Childhood Experiences Study." *Journal of the American Medical Association* 286: 3089–96.

Dube, S. R., R. F. Anda, V. J. Felitti, V. J. Edwards, and J. B. Croft. 2002. "Adverse Childhood Experiences and Personal Alcohol Abuse as an Adult." *Addictive Behaviors* 27: 713–25.

Dunkle, K. L., R. K. Jewkes, H. C. Brown, G. E. Gray, J. A. McIntryre, and S. D. Harlow. 2004. "Gender-Based Violence, Relationship Power, and Risk of HIV Infection in Women Attending Antenatal Clinics in South Africa." *Lancet* 363 (9419): 1415–21.

Duque, L. F., J. Klevens, and C. Ramirez. 2003. "Cross Sectional Survey of Perpetrators, Victims, and Witnesses of Violence in Bogotá, Colombia." *Journal of Epidemiology and Community Health* 57 (5): 355–60.

Ezzati, M., S. Vander Hoorn, A. D. Lopez, G. Danaei, A. Rodgers, C. Mathers, and C. J. L. Murray. 2006. "Comparative Quantification of Mortality and the Burden of Disease Attributable to Selected Major Risk Factors for 2001." In A. D. Lopez, C. D. Mathers, M. Ezzati, D. T. Jamison, and C. J. L. Murray, eds. *Global Burden of Disease and Risk Factors.* New York: Oxford University Press.

Fajnzylber, P., D. Lederman, and N. Loayza. 2000. "Crime and Violence: An Economic Perspective." *Economia* 1: 219–78.

Farrington, D. P. 2003. "Advancing Knowledge about the Early Prevention of Adult Antisocial Behaviour." In *Early Prevention of Adult Antisocial Behaviour,* ed. D. P. Farrington and J. W. Coid, 1–31. Cambridge, U.K.: Cambridge University Press.

Felitti, V. J., R. F. Anda, D. Nordenberg, D. F. Williamson, A. M. Spitz, V. Edwards, and others. 1998. "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study." *American Journal of Preventive Medicine* 14: 245–58.

Fisher, A., L. Chestnut, and D. Violette. 1989. "The Value of Reducing Risks to Death: A Note on New Evidence." *Journal of Policy Analysis and Management* 8 (1): 88–100.

Fromm, S. 2001. "Total Estimated Cost of Child Abuse and Neglect in the United States: Statistical Evidence." Prevent Child Abuse America. http://www.preventchildabuse.org/learn_more/research_docs/cost_analysis.pdf.

Ghaffar, A. 2001. *National Injury Survey of Pakistan, 1997–1999.* Islamabad: National Injury Research Centre.

Gold, M. R., J. E. Siegel, and M. C. Weinstein. 2001. *Cost-Effectiveness in Health and Medicine.* New York: Oxford University Press.

Greenwood, P. W., K. E. Model, C. P. Rydell, and J. Chiesa. 1996. *Diverting Children from a Life of Crime: Measuring Costs and Benefits.* Santa Monica, CA: Rand.

Groenewald, P., D. Bradshaw, B. Nojilana, D. Bourne, J. Nixon, H. Mahomed, and J. Daniels. 2003. *Cape Town Mortality, 2001, Part I, Cause of Death and Premature Mortality.* Cape Town, South Africa: City of Cape Town, South African Medical Research Council, and University of Cape Town.

Grossman, J. B., and E. M. Garry. 1997. "Mentoring: A Proven Delinquency Prevention Strategy." *Juvenile Justice Bulletin* NCJ 164386. Washington, DC: United States Department of Justice, Office of Justice Programs.

Hahn, R. A., O. O. Bilukha, A. Crosby, M. T. Fullilove, A. Liberman, E. K. Moscicki, and others. 2003. "First Reports Evaluating the Effectiveness of Strategies for Preventing Violence: Firearms Laws." *Morbidity and Mortality Weekly Report* 52 (RR14): 11–20.

Harris, A. R., S. H. Thomas, G. A. Fisher, and D. J. Hirsch. 2002. "Murder and Medicine: The Lethality of Criminal Assault 1960–1999." *Homicide Studies* 6 (2): 128–66.

Hasbrouck, L. M., T. Durant, E. Ward, and G. Gordon. 2002. "Surveillance of Interpersonal Violence in Kingston, Jamaica: An Evaluation." *Injury Control and Safety Promotion* 9 (4): 249–53.

Heise, L., and C. Garcia-Moreno. 2002. "Violence by Intimate Partners." In *World Report on Violence and Health,* ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 87–121. Geneva: World Health Organization.

Hemenway, D. 2004. *Private Guns, Public Health.* Ann Arbor: University of Michigan Press.

Hillis, S. D., R. F. Anda, V. J. Felitti, and P. A. Marchbanks. 2001. "Adverse Childhood Experiences and Sexual Risk Behaviors in Women: A Retrospective Cohort Study." *Family Planning Perspectives* 33 (5): 206–11.

Hillis, S. D., R. F. Anda, V. J. Felitti, D. Nordenberg, and P. A. Marchbanks. 2000. "Adverse Childhood Experiences and Sexually Transmitted Diseases in Men and Women: A Retrospective Study." *Pediatrics* 106: E11.

Hoel, H., K. Sparks, and C. L. Cooper. 2001. "Estimating the Costs." In *The Cost of Violence/Stress at Work and the Benefits of a Violence/Stress-Free Working Environment*, 38–51. Geneva: International Labour Organization. http://www.ilo.org/public/english/protection/safework/whpwb/econo/costs.pdf.

Houry, D., K. M. Feldhaus, S. R. Nyquist, J. Abbot, and P. T. Pons. 1999. "Emergency Department Documentation in Cases of Intentional Assault." *Annals of Emergency Medicine* 34: 715–19.

Jeenah, M. S., Y. Dada, C. Househam, and D. Harrison. 1997. *Essential National Health Research in South Africa.* Document 97.1. Geneva: Council for Health Research and Development.

Jewkes, R., P. Sen, and C. Garcia-Moreno. 2002. "Sexual Violence." In *World Report on Violence and Health,* ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 147–81. Geneva: World Health Organization.

Klein, S. R., I. J. Kanno, D. A. Gilmore, and S. E. Wilson. 1999. "The Socioeconomic Impact of Assault Injuries on an Urban Trauma Center." *American Surgeon* 57 (12): 793–97.

Kobusingye, O. C., D. Guwatudde, and R. R. Lett. 2001. "Injury Patterns in Rural and Urban Uganda." *Injury Prevention* 7 (1): 46–50.

Kobusingye, O. C., and R. R. Lett. 2000. "Hospital-Based Trauma Registries in Uganda." *Journal of Trauma* 48 (3): 498–502.

Krug, E. G., L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano. 2002a. *World Report on Violence and Health.* Geneva: World Health Organization.

Krug, E. G., L. I. Dahlberg, J. A. Mercy, A. B. Zwi, and A. Wilson. 2002b. "The Way Forward: Recommendations for Action." In *World Report on Violence and Health,* ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 243–60. Geneva: World Health Organization.

Kruger, J., A. Butchart, M. Seedat, and A. Gilchrist. 1998. "A Public Health Approach to Violence Prevention in South Africa." In *The Dynamics of Aggression and Violence in South Africa,* ed. R. van Eeden and M. Wentzel, 399–424. Pretoria: Human Sciences Research Council.

Loeber, R., P. Wung, K. Keenan, B. Biroux, M. Stouthamer-Loeber, W. B. Van Kammen, and others. 1993. "Developmental Pathways in Disruptive Child Behavior." *Development and Psychopathology* 5: 103–33.

Lopez, A. D., C. D. Mathers, M. Ezzati, D. T. Jamison, and C. J. L. Murray, eds. 2006. *Global Burden of Disease and Risk Factors.* New York: Oxford University Press.

Ludwig, J., and P. J. Cook, eds. 2003. *Evaluating Gun Policy*. Washington, DC: Brookings Institution.

C. D. Mathers, A. D. Lopez, and C. J. L. Murray. 2006. "The Burden of Disease and Mortality by Condition: Data, Methods, and Results for 2001." In A. D. Lopez, C. D. Mathers, M. Ezzati, D. T. Jamison, and C. J. L. Murray, eds. *Global Burden of Disease and Risk Factors.* New York: Oxford University Press.

Meddings, D. R., and S. M. O'Connor. 1999. "Circumstances around Weapon Injury in Cambodia after Departure of a Peacekeeping Force: Prospective Cohort Study." *British Medical Journal* 319 (7207): 412–15.

Medical Research Council of South Africa. 2004. "Crime, Violence, and Injury Lead Programme." http://www.mrc.ac.za/crime/about.htm.

Mercy, J. A., A. Butchart, D. Farrington, and M. Cerda. 2002. "Youth Violence." In *World Report on Violence and Health*, ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 25–56. Geneva: World Health Organization.

Mercy, J. A., and W. R. Hammond. 1999. "Preventing Homicide: A Public Health Perspective." In *Studying and Preventing Homicide: Issues and Challenges*, ed. M. D. Smith and M. Zahn, 274–94. Thousand Oaks, CA: Sage.

Mercy, J. A., E. G. Krug, L. L. Dahlberg, and A. B. Zwi. 2003. "Violence and Health: The United States in a Global Perspective." *American Journal of Public Health* 93 (2): 256–61.

Mercy, J. A., M. L. Rosenberg, K. E. Powell, C. V. Broome, and W. L. Roper. 1993. "Public Health Policy for Preventing Violence." *Health Affairs* 12 (4): 7–29.

Michael, M., D. R. Meddings, S. Ramez, and J. L. Gutierrez-Fisac. 1999. "Incidence of Weapon Injuries Not Related to Interfactional Combat in Afghanistan in 1996: Prospective Cohort Study." *British Medical Journal* 319 (7207): 415–17.

Miller, T. R. 1995. "Costs Associated with Gunshot Wounds in Canada in 1991." *Canadian Medical Association Journal* 153 (9): 1261–68.

———. 2001. "Costs of Juvenile Violence: Policy Implications." *Pediatrics* 107 (1): 1–7.

Miller, T. R., and M. A. Cohen. 1997. "Costs of Gunshot and Cut/Stab Wounds in the United States, with Some Canadian Comparisons." *Accident Analysis and Prevention* 29 (3): 329–41.

Miller, T. R., M. A. Cohen, and S. B. Rossman. 1993. "Victim Costs of Violent Crime and Resulting Injuries." *Health Affairs* 12 (4): 186–97.

Mock, C., J. D. Lormand, J. Goosen, M. Joshipura, and M. Peden. 2004. *Guidelines for Essential Trauma Care.* Geneva: World Health Organization.

Morrison, A. R., and M. B. Orlando. 1999. "Social and Economic Costs of Domestic Violence: Chile and Nicaragua." In *Too Close to Home: Domestic Violence in the Americas,* ed. A. R. Morrison and M. L. Biehl, 51–80. New York: Inter-American Development Bank.

Muelleman, R. L., J. Reuwer, T. G. Sanson, L. Gerson, R. H. Woolard, A. H. Yancy, and others. 1996. "An Emergency Medicine Approach to Violence throughout the Life Cycle." *Academic Emergency Medicine* 3 (7): 708–15.

National Center for Injury Prevention and Control. 2002. *CDC Injury Research Agenda.* Atlanta: Centers for Disease Control and Prevention.

National Crime Prevention Council. 1999. *Saving Money while Stopping Crime.* Washington, DC: National Crime Prevention Council.

Odero, W. O., and J. C. Kibosia. 1995. "Incidence and Characteristics of Injuries in Eldoret, Kenya." *East African Medical Journal* 72 (11): 706–10.

Ozanne-Smith, J., K. Ashby, S. Newstead, V. Z. Stathakis, and A. Clapperton. 2004. "Firearm Related Deaths: The Impact of Regulatory Reform." *Injury Prevention* 10: 280–86.

Payne, J. E., T. V. Berne, R. L. Kaufman, and R. Dubrowskij. 1993. "Outcome of Treatment of 686 Gunshot Wounds of the Trunk at Los Angeles County–USC Medical Center." *Journal of Trauma* 34 (2): 276–81.

Peden, M., and J. van der Spuy. 1998. "The Cost of Treating Firearm Victims." *Trauma Review* 6 (2): 4–5.

Rahman, F., Y. Ali, R. Andersson, and L. Svanstrom. 2001. "Epidemiology of Injury: Results from Injury Registration at District Level Hospital in Bangladesh: Implications for Injury Surveillance in Low-Income Countries." *Injury Control and Safety Promotion* 8 (1): 29–36.

Rahman, F., R. Andersson, and L. Svanstrom. 1998. "Medical Help Seeking Behaviour of Injury Patients in a Community in Bangladesh." *Public Health* 112 (1): 31–35.

Reza, A., J. A. Mercy, and E. G. Krug. 2001. "The Epidemiology of Violent Deaths in the World." *Injury Prevention* 7 (2): 104–11.

Roberts, L., R. Lafta, R. Garfield, J. Khudhairi, and G. Burnham. 2004. "Mortality before and after the 2003 Invasion of Iraq: Cluster Sample Survey." *Lancet* 364 (9448): 1857–64.

Rosenberg, M. L., ed. 1985. *Violence as a Public Health Problem: Background Papers for the Surgeon General's Workshop on Violence and Public Health.* Leesburg, VA. October.

Rosenberg, M. L., and M. A. Fenley, eds. 1991. *Violence in America: A Public Health Approach.* New York: Oxford University Press.

Runyan, D., C. Wattam, R. Ikeda, F. Hassan, and L. Ramiro. 2002. "Child Abuse and Neglect by Parents and Other Caregivers." In *World Report on Violence and Health,* ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 57–86. Geneva: World Health Organization.

Sethi, D., S. Habibula, K. McGee, M. Peden, S. Bennett, A. A. Hyder, and others. 2004. *Guidelines for Conducting Community Surveys on Injuries and Violence.* Geneva: World Health Organization.

Sethi, D., S. Marais, M. Seedat, J. Nurse, and A. Butchart. 2004. *Handbook for the Documentation of Interpersonal Violence Prevention Programmes.* Geneva: World Health Organization, Department of Injuries and Violence Prevention.

Sutherland, I., V. Sivarajasingam, and J. P. Shepherd. 2002. "Recording of Community Violence by Medical and Police Services." *Injury Prevention* 8: 246–47.

Swart, L., A. Gilchrist, A. Butchart, M. Seedat, and L. Martin. 2000. "Rape Surveillance through District Surgeon Offices in Johannesburg, 1996–1998: Findings, Evaluation, and Prevention Implications." *South African Journal of Psychology* 30 (2): 1–10.

Thornton, T. A., C. A. Craft, L. L. Dahlberg, B. S. Lynch, and K. Baer. 2002. *Best Practices of Youth Violence Prevention: A Sourcebook for Community Action.* Rev. ed. Atlanta: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

Tolan, P. H., and D. Gorman-Smith. 1998. "Development of Serious and Violent Offending Careers." In *Serious and Violent Juvenile Offenders: Risk Factors and Successful Interventions,* ed. R. Loeber and D. P. Farrington, 13–29. Thousand Oaks, CA: Sage.

United Nations Population Fund. 1998. "Reproductive Health Effects of Gender-Based Violence." *UNFPA Annual Report 1998,* 20–21. http://www.unfpa.org/about/report/report98/ppgenderbased.htm.

U.S. Department of Health and Human Services. 2001. *Youth Violence: A Report of the Surgeon General.* Rockville, MD: U.S. Department of Health and Human Services. http://www.mentalhealth.org/youthviolence/surgeongeneral/SG_Site/home.asp.

Utting, D. 2003. "Prevention through Family and Parenting Programs." In *Early Prevention of Adult Antisocial Behaviour,* ed. D. P. Farrington and J. W. Coid, 243–64. Cambridge, U.K.: Cambridge University Press.

Villaveces, A., P. Cummings, V. E. Espitia, T. D. Koepsell, B. McKnight, and A. L. Kellermann. 2000. "Effect of a Ban on Carrying Firearms on Homicide Rates in 2 Colombian Cities." *Journal of the American Medical Association* 283 (9): 1205–9.

Viscusi, W. K. 1993. "The Value of Risks to Life and Health." *Journal of Economic Literature* 31 (4): 1912–46.

Waters, H., A. Hyder, Y. Rajkotia, S. Basu, and A. Butchart. 2004. *The Economic Dimensions of Interpersonal Violence.* Geneva: World Health Organization, Department of Injuries and Violence Prevention.

WHO (World Health Organization). 1999. *Report of the Consultation on Child Abuse Prevention.* WHO/HSC/PVI/99.1. Geneva: WHO.

WHO Global Consultation on Violence and Health. 1996. *Violence: A Public Health Priority.* WHO/EHA/SPI.POA.2. Geneva: WHO.

Williams, K. R., N. G. Guerra, and D. S. Elliott. 1997. *Human Development and Violence Prevention: A Focus on Youth.* Boulder: University of Colorado, Center for the Study and Prevention of Violence, Institute of Behavioral Science.

Williamson, D. F., T. J. Thompson, R. F. Anda, W. H. Dietz, and V. J. Felitti. 2002. "Body Weight and Obesity in Adults and Self-Reported Abuse in Childhood." *International Journal of Obesity and Related Metabolic Disorders* 26: 1075–82.

Wolf, R., L. Daichman, and G. Bennett. 2002. "Abuse of the Elderly." In *World Report on Violence and Health,* ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 125–45. Geneva: World Health Organization.

World Bank. 2004. "List of World Economies." Washington, DC: World Bank. http://www.worldbank.org.

Zwi, A. B., R. Garfield, and A. Loretti. 2002. "Collective Violence." In *World Report on Violence and Health,* ed. E. G. Krug, L. L. Dahlberg, J. A. Mercy, A. B. Zwi, and R. Lozano, 213–39. Geneva: World Health Organization.