

The economic dimensions of interpersonal violence



WORLD HEALTH
ORGANIZATION

Geneva

The Economic Dimensions of Interpersonal Violence



DEPARTMENT OF INJURIES AND VIOLENCE PREVENTION
WORLD HEALTH ORGANIZATION
20 AVENUE APPIA
1211 GENEVA 27
SWITZERLAND

WHO Library Cataloguing-in-Publication Data

The economic dimensions of interpersonal violence / Hugh Waters ... [et al.].

1.Violence - economics 2.Violence - prevention and control 3.Costs and cost analysis
4.Review literature I.Waters, Hugh.

ISBN 92 4 159160 9

(LC/NLM classification: HV 6625)

© World Health Organization 2004

All rights reserved. Publications of the World Health Organization can be obtained from Marketing and Dissemination, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel: +41 22 791 2476 ; fax: +41 22 791 4857 ; email: bookorders@who.int). Requests for permission to reproduce or translate WHO publications - whether for sale or for noncommercial distribution - should be addressed to Publications, at the above address (fax: +41 22 791 4806; email: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The World Health Organization does not warrant that the information contained in this publication is complete and correct and shall not be liable for any damages incurred as a result of its use.

Printed in France

Editorial Committee and Project Team

Department of International Health, Johns Hopkins Bloomberg School of Public Health

Hugh Waters, MS, PhD

Adnan Hyder, MD, PhD

Yogesh Rajkotia, MSc

Suprotik Basu, MHS

Julian Ann Rehwinkel, MPH

Injuries and Violence Prevention Department, World Health Organization

Alexander Butchart, MA, PhD

Acknowledgements

The input of the following individuals who peer reviewed earlier drafts of this report is gratefully acknowledged.

David J. Ball, Middlesex University, United Kingdom.

Nancy Cardia, Centre for the Study of Violence, University of São Paulo, Brazil.

Phillip J Cook, Duke University, USA.

Phaedro Corso, Centers for Disease Control and Prevention, USA.

Elizabeth Eckermann, Deakin University, Australia.

Patricia Hernandez, World Health Organization, Geneva.

Pat Mayhew, Australian Institute of Criminology, Australia.

James Mercy, Centers for Disease Control and Prevention, USA.

Staff of the WHO Department of Injuries and Violence Prevention who also provided comments on earlier drafts of the report includes Dr Andrés Villaveces, Ms Alison Phinney, Dr David Meddings and Ms Laura Sminkey.

The development and publication of this handbook has been made possible by the generous financial support of the Government of Sweden

Suggested citation

Waters H, Hyder A, Rajkotia Y, Basu S, Rehwinkel JA, Butchart A. *The economic dimensions of interpersonal violence*. Department of Injuries and Violence Prevention, World Health Organization, Geneva, 2004.

Contents

Abbreviations	vii
Foreword	viii
Summary	x

1. Introduction 1

1.1 Definitions	2
1.2 An ecological framework for assessing the economic dimensions of interpersonal violence ..	4
1.3 Types of costs	6
1.4 Economic evaluation of interventions	7
1.5 Key methodological issues	8
1.6 Search strategy	10
1.7 Characteristics of included and excluded literature	11

2. Costs of interpersonal violence 13

2.1 Overview of the costs	13
2.2 Child abuse and neglect	15
2.3 Intimate partner violence	17
2.4 Sexual violence	21
2.5 Workplace violence	22
2.6 Youth violence	24
2.7 Guns, drugs and gangs	24
2.8 Effects on public finances	26

3. Economic effects of interventions to reduce interpersonal violence 28

4. Effects of economic factors and policies on interpersonal violence 34

4.1 Absolute income levels and interpersonal violence	35
4.2 Employment and social networks	36
4.3 Income inequalities	37
4.4 Inter-generational effects	39
4.5 Policy responses	40
4.6 Future directions in exploring the role of economic factors in interpersonal violence ..	40

5. Conclusion 42

5.1 Methodological issues	42
5.2 Gaps in the literature and directions for future research	43

Appendix 1	Types of cost evaluations	45
Appendix 2	Electronic databases and web sites searched	46
Appendix 3	Categories used to abstract literature	48
References	49

Tables and Figures

Box 1	The value of a human life	9
Figure 1	Ecological model for understanding interpersonal violence	6
Figure 2	Costs and benefits of interpersonal violence	10
Table 1	Costs of social violence in Latin America	14
Table 2	Costs of child abuse - selected studies	16

Table 3	Costs of intimate partner violence - selected studies	18
Table 4	Costs of sexual violence - selected studies.....	22
Table 5	Costs of workplace violence - selected studies	23
Table 6	Costs of youth violence - selected studies	24
Table 7	Economic evaluations of interventions to reduce violence - selected studies ..	28
Table 8	Selected studies exploring the relationship between economic factors and violence	34

Abbreviations

CBA	cost-benefit analysis
CDC	Centers for Disease Control and Prevention (USA)
CEA	cost-effectiveness analysis
CUA	cost-utility analysis
DALY	disability-adjusted life year
HMO	healthcare maintenance organization
IADB	Inter-American Development Bank
ILO	International Labour Organisation
NCVS	National Crime Victimization Survey (USA)
NVAWS	National Violence against Women Survey (USA)
QALY	quality-adjusted life year
WHO	World Health Organization
WRVH	World Report on Violence and Health

Foreword

WHO's *World report on violence and health* (published in 2002) makes a strong case for violence prevention. It reviewed available scientific evidence. It showed the need to work at all levels of the ecological model - with individuals, families, communities and societies - and to draw upon the contributions of multiple sectors, such as justice, education, welfare, employment and health. It concluded that violence prevention is complex, but is possible. The present report, on *The economic dimensions of interpersonal violence*, strengthens the case for investing in prevention even further by highlighting the enormous economic costs of the consequences of interpersonal violence, and reviewing the limited but nonetheless striking evidence for the cost-effectiveness of prevention programmes.

The first section of this report presents an ecological model for assessing the economic dimensions of interpersonal violence, and addresses some of the methodological issues around the costing of violence, its consequences and efforts to prevent it. The second section reviews the available evidence for the direct and indirect economic costs of child abuse and neglect; intimate partner violence; sexual assault; workplace violence and youth violence; and the effect on public finances of selected risk factors for interpersonal violence, including firearms, alcohol, drugs and gangs. Section three reviews cost-effectiveness studies of programmes to prevent child abuse and neglect, intimate partner violence, youth violence and gun violence. The fourth section examines selected recent studies that explore the relationship between interpersonal violence and economic factors that can potentially be modified through policy interventions, including poverty, economic inequality, employment and social networks. The report concludes by identifying the many gaps in the literature (for instance, there were no studies of the costs of elder abuse, few from developing countries and few cost-effectiveness studies), and defining a research agenda for future studies of the costs of interpersonal violence, which it recommends should be based upon a standardized methodology that, unlike the currently dominant human capital approach, allows for the comparison of the costs of interpersonal violence across countries and different economies.

After reading this report one is left with three key messages. First, that the consequences of interpersonal violence are extremely costly. Second, that prevention studies show evidence of cost effectiveness. Third, that for most of the developing world and many developed countries there is not even descriptive information about the direct costs of treating the consequences of interpersonal violence. Together, these messages outline one of the major challenges in the years ahead, which is to systematically establish a solid base of evidence about

the costs of interpersonal violence in all societies, and then to feed this evidence into policy-making and advocacy where it can complement and strengthen moral arguments for the prevention of interpersonal violence. To do any less would mean that public health has failed to meet its obligations to promote health and safety for all.

Dr Etienne Krug
Director
Department of Injuries and Violence Prevention
World Health Organization
Geneva, Switzerland

Summary

Interpersonal violence is expensive. For instance, estimates of the cost of violence in the United States of America reach 3.3% of the gross domestic product. In England and Wales, the total costs from violence - including homicide, wounding and sexual assault - amount to an estimated \$40.2 billion annually¹.

Interpersonal violence is defined to include violence between family members and intimate partners and violence between acquaintances and strangers that is not intended to further the aims of any formally defined group or cause. Self-directed violence, war, state-sponsored violence and other collective violence are specifically excluded from these definitions.

This report, based on an extensive review of peer reviewed articles and published and unpublished reports, treats the following themes:

- ▶ The economic effects of interpersonal violence in a variety of socioeconomic and cultural settings.
- ▶ The economic effects of interventions intended to reduce interpersonal violence.
- ▶ The effects of economic conditions and policies on interpersonal violence - with particular reference to poverty, structural adjustment, income equality and social investment.

Interpersonal violence disproportionately affects low- and middle-income countries. The economic effects are also likely to be more severe in poorer countries. However, as this report shows, there is a scarcity of studies of the economic effects of this violence in low- and middle-income countries. Comparisons with high-income countries are complicated by the fact that economic losses related to productivity tend to be undervalued in low-income countries since these losses are typically based on foregone wages and income. For example, a single homicide is calculated to cost, on average, \$15 319 in South Africa, \$602 000 in Australia, \$829 000 in New Zealand, and more than \$2 million in the USA.

Many of the studies detailing the costs of violence are from the USA where child abuse results in \$94 billion in annual costs to the economy - 1.0% of the gross domestic product. Direct medical treatment costs per abused child have been calculated by different studies to range from \$13 781 to \$42 518. Intimate partner violence costs the USA economy \$12.6 billion on an annual basis - 0.1% of the gross domestic product - compared to 1.6% of the gross domestic product in Nicaragua and 2.0% of the gross domestic product in Chile. Gun violence - which includes suicides - has alone been calculated at \$155 billion annually in

¹ Throughout this document, to enable comparisons and to adjust for inflation and varying exchange rates, monetary values have been converted to 2001 US dollars. This was done by converting other currency amounts to US dollars using the exchange rate at the mid-point of the year of the estimate, then converting the resulting US dollar estimate to 2001 US dollars using the official US consumer price index. The exchange rates used are those from international markets, and are not adjusted for purchasing power parity

the USA, with lifetime medical treatment costs per victim ranging from \$37 000 to \$42 000.

Evidence abounds that the public sector - and thus society in general - bears much of the economic burden of interpersonal violence. Several studies in the USA showed that from 56% to 80% of the costs of care for gun and stabbing injuries are either directly paid by public financing or are not paid at all - in which case they are absorbed by the government and society in the form of uncompensated care financing and overall higher payment rates. In low- and middle-income countries, it is also probable that society absorbs much of the costs of violence through direct public expenditures and negative effects on investment and economic growth.

There are relatively few published economic evaluations of interventions targeting interpersonal violence. Available studies showed that preventive interventions to stop interpersonal violence occurring cost less than the money that they save, in some cases by several orders of magnitude. The 1994 Violence Against Women Act in the USA has resulted in an estimated net benefit of \$16.4 billion, including \$14.8 billion in averted victim's costs. A separate analysis showed that providing shelters for victims of domestic violence resulted in a benefit to cost ratio between 6.8 and 18.4. Similarly, the costs of a programme to prevent child abuse through counselling equalled 5.0% of the costs of child abuse itself. Implementation of a gun registration law in Canada cost \$70 million, in comparison with a total annual cost of \$5.6 billion for firearm-related injuries in that country. Interventions that targeted juvenile offenders - including aggression replacement training and foster care treatment - resulted in economic benefits that were more than 30 times greater than the corresponding costs.

The approaches taken to several key methodological issues differed substantially across the studies reviewed. Studies documenting the economic effects of interpersonal violence have used a broad range of categories of costs. Those estimating indirect costs - including the opportunity cost of time, lost productivity and reduced quality of life - provided higher cost estimates than studies that limited the costs of violence to direct costs alone. Other key methodological issues included the economic values assigned to human life, lost productive time and psychological distress. The rate at which future costs and benefits are discounted, in accounting terms, also varied across studies.

Given the wide range of methodological differences and extensive gaps in the existing literature on the economics of interpersonal violence, there is a clear need for systematic future research into the costs of violence. Such research should follow rigorous methodological guidelines, be inclusive of both direct and indirect cost categories, and - perhaps most importantly - be comparable across countries and settings.

The *World report on violence and health* (Krug et al., 2002) also showed that effective interventions are available - particularly in the areas of child abuse and neglect by caregivers, youth violence and gun-related violence. Given the overwhelming evidence of the high costs of interpersonal violence, detailed analysis of the economic feasibility of interventions is a clear research priority.

1 Introduction

The 2002 *World Report on Violence and Health* (WRVH), published by the World Health Organization (WHO), documented in detail the extent and consequences of violence around the world. Global statistics showed that 520 000 individuals were victims of homicide in 2000; this number was almost certainly underestimated given incomplete reporting systems and the illicit nature of violence.

Violence disproportionately affects low- and middle-income countries. The WRVH estimated that more than 90% of all violence-related deaths occurred in these countries. The estimated rate of violent death in low- and middle-income countries was 32.1 per 100 000 people in 2000, compared to 14.4 per 100 000 in high-income countries. As a result, the economic effects of violence were also likely to be proportionally more severe in poorer countries. Nonetheless, as this document shows, there was a scarcity of studies of the economic effects of violence in low- and middle-income countries².

The WRVH divided violence into interpersonal violence, self-directed violence and collective violence. This report focuses on the relationships between the first type - interpersonal violence - and economic factors. Based on an extensive review of published articles and unpublished reports, the report treats the following themes:

- ▶ The economic effects of interpersonal violence in a wide variety of socioeconomic and cultural settings (Chapter 2). Economic effects were measured at the individual level as direct economic costs and benefits, lost earnings, psychological costs and lost investments in human capital - and at the aggregate level in terms of the effects of interpersonal violence on investment, social cohesion and economic growth.
- ▶ The economic effects of interventions intended to reduce interpersonal violence (Chapter 3).
- ▶ The effects of economic conditions and policies on interpersonal violence - with particular reference to poverty, structural adjustment, income equality and social investment (Chapter 4).

Throughout this report, a public health economics perspective is taken to the problem of interpersonal violence. Cost-benefit analysis, cost-effectiveness analysis and the documentation of the economic costs of violence in terms of

² This report classifies countries by income level using the following categories from the 2003 World Development Report (World Bank, 2003): low-income - \$745 per capita or less; lower middle-income - \$746 to \$2975; upper middle-income - \$2976 to \$9205; high-income - \$9206 or more.

lost productivity and human capital dominated the methodologies used in the literature reviewed here. It is important to note that there are several other approaches to assessing the human toll of violence, including distinct literatures from the sociological, anthropological, epidemiological and biomedical perspectives. While related to each of these, the economic approach is unique in its attempt to quantify, in monetary terms, the multifaceted causes and effects of interpersonal violence. Since this report focuses on the economic approach, a review of the literature reflecting these other perspectives lies beyond its scope.

The primary intended audience for this report consists of researchers working in the field of violence prevention for whom a global overview of what is known about the economic causes and effects of violence can provide pointers for a future research and programmatic agenda. A goal of the report is to help frame a research agenda for the field of economic evaluation related to interpersonal violence. The report demonstrates the gaps in the present literature, in terms of both content and methodology. The conclusion discusses the shortcomings of existing studies and proposes initial guidelines for future research that will help to promote comparability of findings across countries, settings and types of violence.

Policy-makers and technical experts working on violence and injury prevention are an important secondary audience for the report, which seeks to make this group aware of the considerable economic costs of interpersonal violence - and of the potential for savings offered by prevention. An important goal is to provide policy-makers with the context necessary to promote and prioritize pertinent research initiatives related to the economics of interpersonal violence - and to position the costs of violence within national-level policy priorities.

1.1 Definitions

WHO defines violence as:

"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, maldevelopment or deprivation" (Krug et al., 2002).

This definition explicitly includes psychological harm and deprivation among the effects of violence, with corresponding implications for calculation of the economic effects of violence (Chapter 2). While there is general agreement that psychological distress is an important component of the economic burden of violence, most studies have not quantified it in calculating the economic effects of violence. Among those that have, there is little agreement in the methodologies used.

This document defines interpersonal violence to include violence between family members and intimates, and violence between acquaintances and strangers that is not intended to further the aims of any formally defined group or cause. Within the broad category of interpersonal violence, family and partner

violence includes child abuse, intimate partner violence and elder abuse. Acquaintance and stranger violence includes stranger rape or sexual assault, youth violence, violence occurring during property crimes and violence in institutional settings such as schools, workplaces and nursing homes. Self-directed violence, war, state-sponsored violence and other collective violence are specifically excluded from these definitions.

Borrowing from the 2002 WRVH and a broad survey of the literature, this document classifies subcategories of interpersonal violence, with corresponding definitions, as follows:

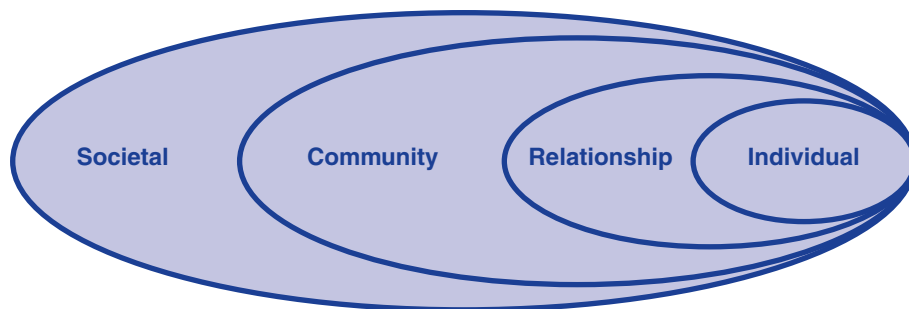
- ▶ Child abuse and neglect: "All forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power" (Krug et al., 2002).
- ▶ Intimate partner violence: Behaviour within an intimate relationship that causes physical, sexual or psychological harm, including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviours. The term covers violence by both current and former spouses and partners. Though women can be violent toward men in relationships, and violence exists in same-sex partnerships, the largest burden of intimate partner violence is inflicted by men against their female partners (Krug et al., 2002).
- ▶ Abuse of the elderly: "A single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person, including physical, psychological or sexual abuse, and neglect."
- ▶ Sexual violence: "Any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances, or acts to traffic, or otherwise directed, against a person's sexuality using coercion, by any person regardless of their relationship to the victim." This definition includes rape, defined as physically forced or otherwise coerced penetration of the vulva or anus, using a penis, other body parts or an object (Krug et al., 2002).
- ▶ Workplace violence: Violence committed in a place of employment.
- ▶ Youth violence: Violence committed by or against individuals between the ages of 10 and 29.
- ▶ Other violent crime.

Chapter 2 describes in detail what is known about the economic effects of each of these types of interpersonal violence, with the exception of elder abuse, where the effects remain largely undocumented.

1.2 An ecological framework for assessing the economic dimensions of interpersonal violence

To assess the economic dimensions of interpersonal violence, it is necessary to understand the causes and identify the factors that increase the likelihood of people becoming victims and perpetrators of such violence. According to the WRVH no single factor can explain why one individual, community or society is more or less likely to experience interpersonal violence. Instead, the Report showed that interpersonal violence is a complex phenomenon rooted in the interaction of many factors ranging from the biological to the political. To capture this complexity, the WRVH adopted an ecological model that organizes the risk factors for interpersonal violence into four interacting levels: the individual level, relationships, community contexts and societal factors (Figure 1).

Figure 1 **Ecological model for understanding interpersonal violence**



- ▶ Individual-level risks include demographic factors such as age, income and education; psychological and personality disorders; alcohol and substance abuse; and a history of engaging in violent behaviour or experiencing abuse.
- ▶ At the relationship level, factors such as poor parenting practices and family dysfunction, marital conflict around gender roles and resources, and associating with friends who engage in violent or delinquent behaviour increase the risk for most types of interpersonal violence.
- ▶ The community level refers to the contexts in which social relationships occur such as neighbourhoods, schools, workplaces and other institutions. Poverty, high residential mobility and unemployment, social isolation, the existence of a local drug trade, and weak policies and programmes within institutions increase the risk of interpersonal violence.
- ▶ Societal-level risks are broad factors that create a climate in which interpersonal violence is encouraged, including economic, social, health and education policies that maintain or increase economic and social inequalities; social and cultural norms that support the use of violence; the availability of means (such as firearms) and weak criminal justice systems that leave perpetrators immune to prosecution.

Interventions to prevent interpersonal violence are likewise usefully categorized by the ecological model. Based on findings from the WRVH, interventions shown through scientific evaluation to be of proven or promising effectiveness in preventing interpersonal violence include the following:

- ▶ Approaches for changing individual behaviour include pre-school enrichment and social development programmes, as well as vocational training and incentives to complete secondary schooling. These are designed to ensure academic success, manage anger and build skills, and are effective in preventing youth violence. Similar life-skills and educational approaches around issues of gender, relationships and power have been used to address physical and sexual violence against women. Effective treatment and counselling can reduce the potential for further physical and psychosocial harm after interpersonal violence has been experienced.
- ▶ Relationship-level interventions include those delivered in early childhood, such as parenting programmes, the provision of support and advice through home visitation in the first 3 years of a child's life, and family therapy for dysfunctional families. These types of approaches, for instance, have been associated with reductions in child abuse and with long-term reductions in violent and delinquent behaviour among young people. Strong mentoring is another approach.
- ▶ Community-level interventions include reducing the availability of alcohol; changing institutional settings - e.g. schools, workplaces, hospitals and long-term care institutions for the elderly - by means of appropriate policies, guidelines and protocols; providing training to better identify and refer people at-risk for interpersonal violence; and improving emergency care and access to health services.
- ▶ At the societal level, promising interventions include providing accurate public information about the causes of interpersonal violence, its risks and its preventability; strengthening law enforcement and judicial systems³; implementing policies and programmes to reduce poverty and inequalities of all kinds; improving support for families; and reducing access to firearms and other means of violence.

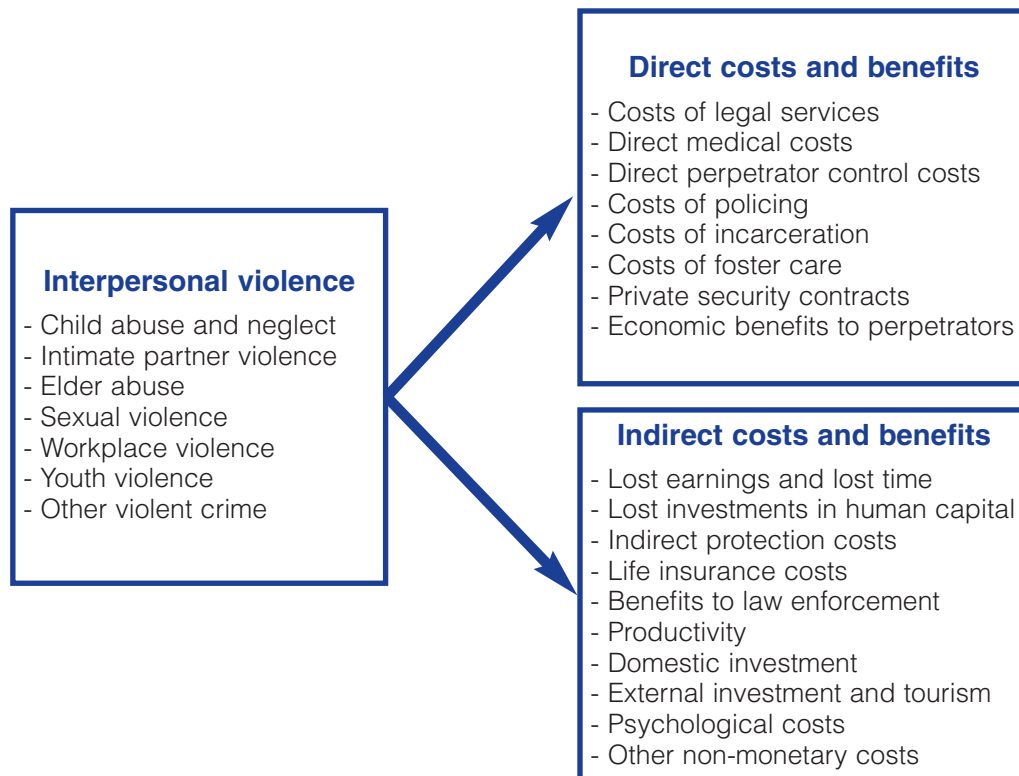
Experiences demonstrating the economic effects of interventions directly intended to reduce interpersonal violence are described in Chapter 3. The effects on interpersonal violence of economic factors at the community and societal levels, and of government policies to address them, are described in Chapter 4.

³ Economic theory predicts that criminal behaviour will respond to incentives, including the threat of punishment. Becker (1993) initiated a line of research using a general cost-benefit framework to model criminals responses to economic incentives.

1.3 Types of costs

Studies documenting the economic effects of interpersonal violence have used a broad range of categories of costs. Much of the difference in terms of the overall estimates made by the studies reviewed in this report was due to the inclusion or exclusion of different categories of costs, rather than to different methodologies in tracking costs.

Figure 2 **Costs and benefits of interpersonal violence**



As shown in Figure 2, cost categories can be broadly grouped into direct costs and benefits - those resulting directly from acts of violence or attempts to prevent them - and indirect costs and benefits. The most commonly cited direct costs were medical care and the costs of the judicial and penal systems - policing and incarceration. Indirect costs included the long-term effects of acts of violence on perpetrators and victims, such as lost wages and psychological costs, also referred to as pain and suffering (Hornick, Paetsch & Bertrand, 2002). The calculation of psychological costs was a common practice in legal cases seeking to assess the monetary value of reimbursement to victims of violence. Psychological costs were generally significantly greater than the direct economic losses incurred by victims (Miller, Cohen & Rossman, 1993). Some studies attempted to place a value on the negative affect of violence on housing values - a cost to society. For example, in the USA, a doubling in homicide rates was associated with a 12.5% decline in property values (IADB, 2002). Other indirect cost categories quantified the effects of violence beyond the immediate perpetrators and victims - for example, a negative impact on investment in countries with high rates of violence and higher insurance rates for all of society.

1.4 Economic evaluation of interventions

The economic evaluation of interventions is undertaken to guide decision-making so that scarce resources can be allocated in the most effective way. Accordingly, one of the main principles of economic evaluation is that it should involve a comparison of the costs and benefits of multiple options (Gold, Siegel & Weinstein, 2001). An economic evaluation can be conducted from a variety of perspectives, such as societal, sectoral or organizational. Each perspective differs in the costs that are selected for evaluation. The selection of a perspective will largely depend on the primary stakeholder; but when multiple major stakeholders are present, as often is the case, it is not uncommon to conduct an economic evaluation from multiple perspectives.

A range of economic analyses have commonly been used for comparing violence interventions, including cost-utility analysis, cost-benefit analysis and cost-effectiveness analysis (see Appendix 1 for further explanation of the typologies). The type of evaluation conducted will depend on the outcome indicator used - for example, quality-adjusted life years (QALYs), monetary units or cases averted. While intervention-specific indicators allow for more accurate assessments of particular interventions, they also limit the ability of making cross-intervention comparisons. For example, if intervention A has a ratio of \$0.01 per rehabilitation session attended, and intervention B has a ratio of \$10 per crime averted, it is difficult to determine which intervention is a better use of resources. Therefore, when choosing an outcome indicator, it is essential to consider all of the plausible comparisons so that the evaluation can be effectively used as a decision-making tool (Drummond & McGuire, 2001).

Intervention Costs

Programme costs arise from the development and implementation of interventions aimed at reducing the burden of interpersonal violence. This will include the costs of all inputs - both fixed capital investments and recurrent programme costs - necessary to provide the intervention. Common examples of such costs include operating costs, labour costs and capital costs (Drummond & McGuire, 2001). Programme costs are especially important when conducting economic evaluations to compare interventions, since these costs will likely vary between interventions and can greatly influence their relative cost-effectiveness. Therefore, when reading the later sections in this report regarding the benefits of individual interventions, particular scrutiny should be given to their associated programme costs.

From an economic perspective, the reduction of direct and indirect costs resulting from an intervention can be referred to as the benefits of that intervention. Programme costs, however, can be thought of as the investment necessary to achieve those benefits. Therefore, programme costs will most often be found in the numerator of a cost-effectiveness analysis (as costs), whereas the reduction of direct or indirect costs will be found in the denominator (as benefits).

Intervention Benefits

A wide variety of indicators can be used to measure the benefits of an intervention, and their selection will largely depend on the goals of that intervention. For example, a violence prevention intervention could be measured in terms of saved lives or violent acts averted, while an intervention targeting prior offenders could be measured by recidivism rates. Less straightforward, however, is the measurement of the benefits gained by interventions aimed at the victims of violent acts. An indicator for this type of intervention not only would have to take into account its impact on the quality of life of the victim, but should also be a metric that allows for comparison between interventions. A potentially powerful candidate for this type of indicator is the QALY.

The basic concept of QALY is straightforward. Utility scores for particular health states are first elicited from members of the targeted population. Health utility scores can range between 0 and 1, where 0 is the equivalent of being dead and 1 represents perfect health, although some health states are regarded as being worse than death and have negative valuations. These scores can be elicited in a number of ways, but the most commonly used are the time-tradeoff, standard gamble, and visual analogue methods (Drummond & McGuire, 2001). The amount of time spent in a particular health state is then weighted by the utility score attributed to that health state. A perfect health (utility score 1) of 1 year would equal 1 QALY, but 1 year in a health state with half of that utility (utility score .5) would equal .5 QALYs. Thus, an intervention that generates 4 additional years in a health state valued at 0.75 will generate 1 more QALY than an intervention that generates 4 additional years in a health state valued at 0.5.

The use of QALYs as an outcome indicator for interventions aimed at victims of violence has so far been limited. Therefore, further research needs to be conducted to determine the feasibility as well as the appropriate methodology for collecting health utility scores from victims of violence. In addition, standardized utility scores - similar to the "EuroQol" survey for health states (Dolan, 1997) - for the different types and degrees of violence should also be developed. Evaluations expressed in other units, such as cost per case averted, could then be modelled to derive a cost per QALY ratio. The overall benefit of this research would be the establishment of a common metric to compare the effectiveness of a wide range of interventions, including violence prevention, offender rehabilitation and victim counselling.

1.5 Key methodological issues

In addition to differences in terms of the categories of costs and benefits included, there were several other methodological issues where there were significant disparities among the studies reviewed. There were important differences in how rates of interpersonal violence were estimated. Sources for estimates included crime reports, hospital records and household surveys. Substantial numbers of violent acts - particularly intimate partner violence - go unreported and untreated. As a result, all of these sources were likely to result in

BOX 1**The value of a human life**

Among studies that quantify the value of lost human life, there is considerable variation in the monetary value assigned to one life. The value of life is most commonly calculated using estimates of the quality of life, wage premiums for risky jobs, willingness to pay for safety measures and individual behaviour related to safety measures such as using seatbelts (Boardman et al., 1996).

The values used among studies reviewed in this document ranged from \$3.1 million to \$6.8 million. These estimates are in line with those generally used in the literature. Miller

(1989) reviewed 29 cost-benefit studies and found that the mean value given to a human life in these studies was \$4.2 million. Fisher, Chestnut & Violette (1989) reviewed 21 studies and found a range of \$2.6 million to \$13.7 million. Walker (1997) used a figure of \$602 000, but this did not include the costs of the judicial system or psychological costs.

Finally, Viscusi (1993) examined 24 studies using wage-risk trade-offs to estimate the value of life. Most of these studies placed the value of life between \$4.0 million and \$9.4 million. Viscusi also pointed out that risk was a less robust predictor of wage levels than other factors, particularly education.

underestimates of the true incidence of violence.

As with any attempt to quantify the costs of morbidity and mortality, a principal methodological difference was in the dollar values assigned to a human life (see Box 1), lost productive time and psychological distress. Another important difference among the studies was the varied perspective from which costs were calculated. The majority of the studies of the costs of violence used a societal perspective - in other words, in principle all costs were included whether they accrued to the victim, the perpetrator, a third party payer or society at large. Several studies, however, included only costs to the victims, without counting the social costs of prevention, law enforcement, incarceration and lost productivity.

A further key methodological difference among studies was the time frame used to calculate costs. Most of the cost estimates of the aggregate economic losses caused by violence were for a 1-year time period. But the time frame varied, making direct comparisons difficult. Studies undertaken from the individual perspective often calculated direct and indirect costs for the lifetime of the individual.

Nearly all studies that calculated costs and benefits beyond a 1-year time frame used some kind of discount rate to estimate future costs and benefits - based on the principle that humans value consumption and quality of life in the present more than they do an equivalent amount of consumption in the future. This concept is rooted in uncertainty about the future - making it more desirable to consume or benefit from life in the short-run than to wait for the equivalent amount of consumption in the future. For economists, the concept of consumption is most often considered equivalent to and measurable by the level of expenditures for an individual or a household. However, the concept of quality of life itself was not consistently defined in the economic literature; generally it was equated with individuals' willingness to pay for improvements in their lives, whether such improvements were material or intangible.

The discount rates used in the studies reviewed here ranged from 2.0% to 10%. It should be noted, however, that only a small proportion of the studies reviewed actually gave the discount rates they used, further complicating comparison of the findings between them. The United States Panel on Cost-Effectiveness in Health and Medicine has recommended using a real rate of 3.0% for cost evaluations in health care (Gold, Siegel & Weinstein, 2001). This rate reflects a wide range of studies documenting individuals' preferences for present consumption compared to future consumption and interest rates for private investment. In theory, both of these factors influence the discount rate for future costs and benefits in the context of financial and health-related gains and losses.

As stated above, monetary values in this document have been converted to 2001 US dollars to enable comparisons and to adjust for inflation and varying exchange rates. Values expressed in other currencies in original documents, and US dollar values from previous years, have been converted to 2001 US dollars using the US consumer price index and applicable international exchange rates from the year of the original estimates. Costs expressed as a percentage of the gross domestic product were calculated using the gross domestic product from the year the costs were reported.

1.6 Search strategy

We conducted a wide-ranging literature search using electronic databases and the Internet as detailed in Appendix 2. The search was conducted without restrictions on the language of publication and included publication dates from January 1980 to May 2003. We used the following keywords, representing types of violent behaviour and factors associated with violent behaviour combined with economic variables:

Violent behaviour and related factors	Economic variables
Violence: interpersonal violence, family violence, partner violence, domestic violence	Costs: cost-effectiveness, cost-benefit
Abuse: child abuse, domestic abuse, partner abuse, girl abuse	Economics: economic policy
Assault	Benefits
Homicide	Investments
Injury and intentional injury	Human capital
Firearms	Expenses

After the initial database and Internet literature searches, additional sources were identified through the reference lists of collected articles and through consultation with resource experts. Studies were included in this review if they contained: a costing component of the violent behaviour's effects or factors associated with this behaviour (the cost of treating firearm-related injuries for instance); costing information on interventions (such as the cost of the

intervention itself or the economic effects of the intervention), or a framework for analyzing the relationship between violence and its various economic dimensions. After the review, a total of 119 studies were retained, of which 54 are from the peer reviewed literature and 65 are not peer reviewed. Of these studies, 79 pertain to the first theme of the review - i.e. the economic effects of interpersonal violence. There are 27 studies relevant to the second theme - the economic effects of interventions intended to reduce interpersonal violence - and 13 pertain to the third theme - the effects of economic conditions and policies on interpersonal violence. The contents of these studies were systematically abstracted using the information categories listed in Appendix 3.

1.7 Characteristics of included and excluded literature

While 119 studies were retained for analysis in this review, a total of 248 were considered based on the keywords described in the search strategy. As a relatively large proportion of all studies examined was excluded, it is important to describe in further detail the exclusion criteria and the characteristics of excluded studies so that, ideally, future research into the economic effects of interpersonal violence might follow more consistently the characteristics of the included studies.

A clearly measurable costing component was a key prerequisite for inclusion in the review. Whereas searches of the social science and policy literature yielded a bounty of research examining various aspects of violence - including strategies for prevention, social environments that foster violence, roles of various stakeholders in violence prevention, and the relationship between violence and social capital - these studies did not generally determine direct or indirect costs related to interpersonal violence. The strength of much of this social science literature is a testament to the importance of considering sociopolitical variables and their relationships with violence and violence prevention. However, the relative lack of economic data on actual monetary costs - direct or indirect - highlights an essential area for increased attention, given the importance of costing data in any accurate reflection of the burden of violence. A number of studies based on theoretical models predicting violence were likewise excluded if they did not have an empirical component.

It is clear from the review that data on economic dimensions of interpersonal violence from low- and middle-income countries are scarce. Much of the raw data from high-income countries have been extracted from central government sources, such as the United States Department of Justice and the Australian Institute of Criminology. A partial explanation for the lack of costing data from low- and middle-income countries is the absence of reliable data collection mechanisms from government sources, leaving little from which researchers can examine trends and draw conclusions. Furthermore, a significant portion of the costing data has been extracted from hospital-based accounting and record-keeping systems - areas in which lower income countries are at a significant disadvantage.

We have presented here a range of costing data to accurately reflect the available literature and have pointed out where there are possible variations in the quality and rigour of the included studies. The discussion of the economic correlates of violence (Chapter 4) briefly reviews key sociological literature relevant to this field and only provides a glimpse into the extensive literature on the relationship between interpersonal violence and factors such as economic inequality, employment rates and welfare expenditure.

2 Costs of interpersonal violence

A total of 119 studies and documents discussing the costs of violence were retained for this review: 54 are from the peer reviewed literature and 65 are from other sources, including governments and international organizations (see Chapter 1 for a discussion of the criteria used to include documents for review in this report). Because no systematically documented studies of the economic effects of abuse of the elderly were found, this category has been dropped from the review. As the 2002 WRVH shows, elder abuse is common in countries of all income levels, indicating the urgent need for further research of this topic.

2.1 Overview of the costs

There are widely varying estimates of the cost of violence internationally, depending on the definitions used, the types of costs included and the methodologies used. In the USA, the Department of Justice (1994) reported the direct costs of violent crime to victims, based on reported crimes and on responses to the National Crime Victimization Survey (NCVS)⁴. In 1994, these costs amounted to \$1.8 billion - 0.02% of the USA gross domestic product for that year.

When indirect costs are included, estimates of the costs of violence in the USA soar. The National Crime Prevention Council (1999) included effects on employment and workers' productivity as well as psychological costs to calculate an estimated \$46.8 billion for the costs of violent crime in the USA - equivalent to 0.5% of the gross domestic product. Miller, Cohen & Rossman (1993) estimated an annual cost of intentional injuries of \$84.1 billion in the USA for the time period 1987-1990. Fromm (2001) estimated an annual cost of \$94 billion to the USA economy resulting from child abuse alone - 1.0% of the gross domestic product. These estimates included psychological costs to the victim - the equivalent of pain and suffering - extrapolated into the future using a discount rate ranging from 3.0% to 5.0%. Throughout the literature on the costs of violence, psychological costs greatly outweighed the direct costs of violence - partially explaining the wide variance in the estimates that are available.

Miller, Fisher & Cohen (2001) used archival data on all 377 000 violent crimes reported in Pennsylvania in 1993. They estimated lost earnings, psychological costs and the opportunity cost of victims' time, in addition to the costs of policing, incarceration and life insurance. Their estimate for Pennsylvania of \$14.2 billion equalled \$329.8 billion when extrapolated to the full USA population; equivalent to 3.3% of the gross domestic product. Separately,

⁴ The NCVS is conducted annually based on 100 000 interviews with crime victims. The NCVS does not include incidents that occurred more than 6 months prior to the interview date.

Miller, Cohen & Wiersema (1996) estimated a total annual cost to victims of personal crime in the USA, including domestic violence, sexual assault, rape and child abuse, of \$507 billion. This estimate, which included psychological costs of pain and suffering, was equivalent to 6.5% of the gross domestic product.

In England and Wales, Brand & Price (2000) estimated total costs from crime of \$63.8 billion; 63%, or \$40.2 billion, of this amount was attributable to violence - including homicide, wounding and sexual assault. This tally included both direct costs such as police and judicial system costs, and indirect costs that included foregone output and physical and emotional costs.

Estimates from other high-income countries tended to be conservative. The Australian Institute of Criminology (2001) reported national annual costs of assault of \$159 million, an estimate that did not include indirect costs and was largely based on the costs of incarcerating offenders. Similarly, the cost of homicide in Australia was calculated at \$194 million per year, based on a cost per homicide of \$602 000 (Walker, 1997). Fanslow et al. (1997) calculated the economic cost from homicide in New Zealand: when lost earnings, legal fees, incarceration and policing were included, the cost per homicide was \$829 000 for a total of \$67.9 million.

At the global level, Pfizer (2001) estimated that crime and violence together cost the equivalent of 5.0% of the gross national product of industrialized countries, and as much as 14% of the gross national product of low-income countries. But there were few documented estimates of the costs of violence in low- and medium-income countries. Additionally, comparisons with high-income countries were complicated by the fact that economic losses related to productivity tended to be undervalued in lower income countries since these losses were typically based on foregone wages and income. Phillips (1998) calculated the cost of homicides in the Western Cape Metropolitan Area in South Africa. Using a 4.0% rate to discount future productivity and opportunity costs, the costs of homicide were \$31.6 million. This worked out to an average of \$15 319 per homicide, sharply lower than the New Zealand estimate above of \$829 000.

Table 1 **Costs of violence in Latin America**

Country	% 1997 gross domestic product lost due to violence
Brazil	10.5%
Colombia	24.7%
El Salvador	24.9%
Mexico	1.3%
Peru	5.1%
Venezuela	11.8%

Source: Buvinic, Morrison & Shifter (1999).
Definition of violence includes collective violence.

The Inter-American Development Bank (IADB) has spearheaded efforts to systematically document the costs of both interpersonal and collective violence in the Americas. Central America has been particularly affected. In 1995, El Salvador spent 6.0% of the gross national product to control violence (IADB, 2002). As part of the IADB's work, Buvinic, Morrison & Shifter (1999) reported estimates of economic losses due to social violence - including collective violence - in a variety of countries (Table 1). These losses ranged from 5.1% of the gross domestic product in Peru to 24.9% in El Salvador, which was still in the throes of guerrilla war in the mid-1990s when the data were generated. The estimates included lost earnings, the opportunity cost of time, policing, incarceration, judicial costs, foregone investments in human capital and effects on investment⁵.

2.2 Child abuse and neglect

The extent of child abuse and neglect is difficult to gauge since much if not most of it is unreported. The 2002 WRVH estimated that the rates of homicide of children under 5 years of age was 2.2 per 100 000 for boys and 1.8 per 100 000 for girls in high-income countries. In low- and middle-income countries, the corresponding rates were 6.1 and 5.1 per 100 000 for boys and girls, respectively. In Africa, the rates were 17.9 per 100 000 for boys and 12.7 per 100 000 for girls.

Most of the estimates of the costs of child abuse available in the literature are from the USA (Table 2). Fromm (2001) reviewed a variety of sources and calculated an aggregate total of \$94 billion in annual costs to the USA economy resulting from child abuse - 1.0% of the gross domestic product. This total included direct medical costs and the related costs of legal services, policing and incarceration, as well as the value of indirect productivity losses, psychological costs and future criminality. Hospitalization accounted for \$3.0 billion, mental health treatment costs for \$425 million, and child welfare costs for \$14.4 billion. The largest single component of Fromm's estimate was adult criminality related to child abuse, for which he calculated an annual figure of \$55.4 billion.

Using secondary sources, Courtney (1999) calculated a figure of \$14 billion for direct costs, including counselling and child welfare services resulting from child abuse in the USA. Caldwell (1992) presented detailed estimates for Michigan, totalling \$1.0 billion. He included direct medical costs, lost tax revenue due to premature death, special education, psychological and welfare services, protective services, foster care, preventive services, and adult criminality and subsequent incarceration related to child abuse. Separately, the United States Department of Health and Human Services (2001) calculated the costs of child abuse and maltreatment in Colorado to be \$468 million - of which indirect costs represented 53%.

There was a considerable range of estimates of individual-level treatment costs for child abuse, depending on the types of costs included. On the high end,

⁵ The cost just of health expenditures related to violence as a percentage of gross domestic product was as follows (Buvinic, Morrison & Shifter, 1999): Brazil 1.9%; Colombia 4.3%; El Salvador 4.3%; Mexico 1.3%; Peru 1.5%; Venezuela 0.3%.

Irazuzta et al. (1997) calculated treatment costs per child of \$42 518 based on daily hospital charges of \$6 317 in a paediatric intensive care unit in Charlestown, West Virginia. Forjuoh (2000), working with discharge data from acute care hospitals in Pennsylvania, calculated a mean hospitalization cost of \$18 103 per child abuse victim. Plotnick & Deppman (1999) calculated an average cost of \$12 028 for hospitalizing an abused child for one week.

Table 2 **Costs of child abuse - selected studies**

Study	Study location and population	Cost categories included (indirect costs in italics)	Total annual costs (2001 US\$)
Peer reviewed articles and government studies			
Courtney (1999)	US. Maltreated children and their families	Direct medical (including counselling)	\$14.0 billion
Evasovich et al. (1998)	US, Ohio (4 counties). Children referred to burn unit for suspected child abuse (n = 104)	Direct medical, legal fees (court costs, fines)	\$0.3 million; \$13 781 per child
Forjuoh (2000)	US, Pennsylvania, 1995. Hospital discharge data (n = 348 children)	Direct medical	\$6.3 million; \$18 103 per child
Irazuzta et al. (1997)	US, West Virginia, 1991-1994. Paediatric ICU admissions (n = 13)	Direct medical	\$0.6 million; \$42 518 per child
New & Berliner (2000)	US, Washington state, 1994. Mental health treatment costs compensated by Crime Victims Compensation program (n = 608 children)	Direct medical	\$1.2 million; \$2 921 per child
Summers & Molyneux (1992)	UK, 1990. Children hospitalized (n = 181)	Direct medical - examinations only	\$128,758 per child
US Department of Health and Human Services (2001)	US, Colorado, 1995	Direct medical, legal services, incarceration, <i>workers' productivity, lost earnings and opportunity cost of lost time</i>	\$468 million
Walker et al. (1999)	US, Washington state. Randomly selected sample of women (n = 1 225) enrolled in an HMO, 42.8% maltreated as children	Direct medical	\$9.1 million; \$17 356 per child
Studies conducted by advocacy groups			
Caldwell (1992)	US, Michigan. Cases recorded by Department of Social Services	Direct medical, incarceration, policing (Protective Services), lost earnings and opportunity cost, <i>lost investments in human capital, psychological costs, other non-monetary costs</i>	\$1.0 billion
Fromm (2001)	US. Aggregated studies	Legal services, direct medical, policing, incarceration, <i>workers' productivity, psychological costs, other non-monetary costs</i>	\$94 billion

Evasovich et al (1998) studied the costs of medical care and related legal fees for children admitted to the burns unit at the Children's Hospital Medical Center in Akron in Ohio - finding costs totalling \$13 781 per child. Public funds paid for 65% of these costs. New & Berliner (2000) examined claims paid by the Crime Victims Compensation programme in Washington state and calculated mental health treatment costs of \$2 921 per child, with counselling services costing between \$70 and \$90 per hour and exclusive of hospitalization or other health care costs.

Walker et al. (1999) studied health care costs for adult women in Washington state who had been abused as children. They found that 42.8% of a randomly selected sample of 1 225 women had been abused as children. The median annual health care costs for these women were \$108 greater than for women who had not been abused.

There are few estimates available of the cost of child abuse internationally. A study of abused children seen in the emergency room of a hospital in Liverpool, England, found annual costs of \$128 758 per child just for assessment and initial treatment (Summers & Molyneux, 1992). Mendonca, Alves & Filho (2002) measured hospital costs due to violence against children and adolescents in Pernambuco state, Brazil. The mean cost of hospitalization for children and adolescents was \$184. Violence against children and adolescents in greater metropolitan Recife, the principal city in the state, accounted for 65.1% of hospital admissions and 77.9% of hospital costs.

2.3 Intimate partner violence

As with other types of interpersonal violence, the true extent of intimate partner violence is unknown. Disparate surveys suggest there is a wide range in prevalence, but the survey results are difficult to compare given cultural differences and taboos in responding to questions. In Paraguay and the Philippines, 10% of women surveyed reported being assaulted by an intimate partner (Heise, Ellsberg & Gottemoeller, 1999), compared to 22% in the USA (Tjaden & Thoennes, 2000), 29% in Canada, and 34% in Egypt (El-Zanaty et al., 1996). Other studies have shown that 3.0% or less of women in Australia, the USA and Canada had been assaulted by a partner in the previous 12 months, compared to 27% of ever-partnered women in León, Nicaragua, 38% of currently married women in the South Korea, and 53% of currently married women in the West Bank and Gaza (Krug et al., 2002). Stanko et al. (1998) estimate the prevalence of domestic violence to be one in nine women in the borough of Hackney in the United Kingdom. Physical violence in intimate relationships was often accompanied by psychological abuse.

Yodanis & Godenzi (1999) and Yodanis, Godenzi & Stanko (2000) summarized the results of studies of the economic costs of intimate partner violence completed in the 1990s. Estimates vary considerably, based on what types of costs are counted, potentially including costs to individuals, governments, employers, and the medical, legal, criminal, financial, housing and social welfare

Table 3 **Costs of intimate partner violence - selected studies**

Study	Study location and population	Cost categories included (indirect costs in <i>italics</i>)	Total annual costs (2001 US\$)
Peer reviewed articles and government studies			
Australian Institute of Criminology (2001)	Australia. Cost of refuge accommodation for victims of intimate partner violence	Costs of legal services, costs of incarceration, victim compensation costs, <i>lost earnings and opportunity cost of lost time</i>	\$14.2 million
Health Canada (2002)	Canada. All types of violence against women	Direct medical	\$1.1 billion
Mansingh & Ramphal (1993)	Jamaica, Kingston Public Hospital, 1991. Costs for treating victims of intimate partner violence	Direct medical	\$454 000
Morrison & Biehl (1999)	1997 stratified random samples: 310 women in Santiago, Chile; 378 women in Managua, Nicaragua	Lost earnings and opportunity cost of time	Extrapolated lost earnings: \$1.73 billion in Chile; \$32.7 million in Nicaragua
New & Berliner (2000)	US, Washington state, 1994: 318 women victims compensated by the Crime Victims Compensation programme	Direct medical (mental health treatment costs)	\$3 087 per patient (median 15 sessions)
Snively (1994)	New Zealand	Direct medical, welfare, legal, policing	\$717 000 for New Zealand
Stanko et al. (1998)	UK, borough of Hackney, 1996	Public services only: policing, legal, medical costs, other monetary costs (housing, refuge, social services)	\$13.3 million
Wisner et al. (1999)	US, Minnesota, 1992-1994. 126 victims of intimate partner violence in a large health plan	Direct medical	\$4 341 per patient
Studies conducted by advocacy groups			
Day (1995)	Canada. Data drawn from surveys	Direct medical (including dental costs), <i>lost earnings and opportunity cost of time, other monetary costs, psychological costs</i>	\$1.2 billion
Korf et al. (1997)	Netherlands, 1997. Female victims of domestic violence	Direct medical, costs of legal services, costs of incarceration, other monetary costs, costs of policing, <i>lost earnings and opportunity costs of time</i>	\$142.2 million
Womankind Worldwide (2002)	US. Lost work and legal expenses for private companies	Direct medical, cost of legal services, costs of policing, <i>employment and workers' productivity, psychological costs, lost earnings and opportunity cost of time</i>	\$3.5 billion
Women's Advocates Inc. (2002)	US overall	Legal services, direct medical, policing, incarceration, other monetary costs (shelters), <i>lost earnings and opportunity cost of time, employment and workers' productivity</i>	\$12.6 billion

sectors of society - as well as differences between direct and indirect costs. As with other types of interpersonal violence, there were complex methodological issues involved in measuring the economic impact of intimate partner violence. Many, if not most, incidents of intimate partner violence go unreported, and the effects of such abuse on investments in human capital and productivity inside and outside the home are difficult to estimate. Unsurprisingly, there is a wide range of estimates of the effects of intimate partner violence internationally, and this literature overlapped considerably with that related to violence against women and domestic violence (Table 3).

Australia

Several studies of the economic costs of intimate partner violence have been carried out in Australia (Laing & Bobic, 2002). A 1998 study in Queensland interviewed 20 women who had experienced domestic violence. Using a 3.0% prevalence estimate for severe domestic violence, based on police and hospital reports, the total annual costs of domestic violence in the province were estimated at over \$106 million. A second study in Queensland included indirect costs related to women's lost wages due to absenteeism from work, resulting in an estimated \$546 million annually. A 1991 study of 40 women in Tasmania calculated \$8 117 in direct costs and an additional \$19 023 in indirect costs - mostly replacement of damaged property - per woman. The Australian Institute of Criminology (2001) reported annual costs of \$14.2 million for refuge accommodation for victims of intimate partner violence in Australia.

Canada

Day (1995) comprehensively calculated the costs of violence against women in Canada, using data from the Statistics Canada Violence against Women Survey, the Canadian Urban Victimization Survey, and the Quebec Health Survey. Including health care costs, policing, legal fees, incarceration, lost earnings and psychological costs, violence against women cost an estimated \$1.2 billion. In these calculations, medical and dental visits are assigned a value of \$67, a probable underestimate - so the total costs are likely to be higher than reported. Health Canada (2002) calculates a cost of \$1.1 billion just for the direct medical costs of violence against women in Canada.

Chile and Nicaragua

As a percentage of the gross domestic product, estimates of the costs of intimate partner violence were considerably higher in low- and middle-income countries than in high-income countries. Morrison, Andrew & Orlando (1999) calculated the costs of domestic violence against women based on stratified random samples of women in Chile and Nicaragua. Based only on the lost productive capacity of these women, they extrapolated total costs of \$1.73 billion in Chile and \$32.7 million in Nicaragua. These estimates did not include the "multiplier" effect - i.e. the foregone productivity would have stimulated additional economic activity. The calculated costs were equivalent to 1.6% of the gross domestic product in Nicaragua and 2.0% of the gross domestic product in Chile.

Jamaica

Mansingh & Ramphal (1993) studied 640 victims of intimate partner violence and other types of violence at the Kingston Public Hospital in Jamaica. Total costs were \$454 000 or \$709 per patient, including materials, drugs and doctors' fees.

Netherlands

Korf et al. (1997) calculated the annual costs of intimate partner violence at \$142.2 million for the Netherlands based on 1996-1997 data. This estimate included a range of direct and indirect costs, including lost productivity, but was based only on women who suffered from domestic violence as reported by registered institutions and women's shelters.

New Zealand

In New Zealand, Snively (1994) estimated the direct social costs of violence against family members - including medical, welfare and judicial system costs, but not including productivity losses or foregone income. Based on a conservative estimate that 1 in 10 families were affected by family violence, Snively calculated \$717 000 in losses for New Zealand, or approximately \$0.20 per capita.

The United Kingdom

Stanko et al. (1998) counted the costs of public services - including policing, court costs, medical care, and refuge - spent in the year 1996 on responses to domestic violence against women in the borough of Hackney in the United Kingdom. They estimated these costs to be \$13.3 million for the borough, averaging \$159 per household. If extrapolated to the entire United Kingdom, this would have resulted in an approximate cost of \$4.5 billion for public services to treat and prosecute domestic violence against women.

USA

Women's Advocates Inc. (2002) calculated that intimate partner violence costs the USA economy \$12.6 billion on an annual basis - 0.125% of the gross domestic product. This estimate included legal and medical services, judicial system costs and lost productivity. Another advocacy group - Womankind Worldwide - estimated that legal services and lost productivity related to intimate partner violence alone cost \$3.5 billion a year (Womankind Worldwide, 2002). Lloyd & Taluc (1999) conducted a study of the effect of intimate partner violence on the labour force participation of 824 randomly-selected women in Chicago in Illinois. They calculated that 18.0% of the women had been physically assaulted and 11.9% had experienced more severe violence. Women who experienced male violence were as likely to be currently employed as other women, but were more likely to have been unemployed in the past, to have health problems and to be welfare recipients.

Several studies used the National Violence Against Women Survey (NVAWS) to

estimate the costs of intimate partner violence. The Centers for Disease Control and Prevention, Atlanta (CDC, 2003) used the 1995 NVAWS to show that an estimated 5.3 million incidents of intimate partner violence occur each year among USA women age 18 and older - resulting in nearly 2 million injuries, more than 550 000 of which required medical attention. Victims of intimate partner violence lost a total of 8.0 million days of paid work. Total costs exceeded \$5.8 billion each year, with \$4.1 billion for direct medical and mental health care services and \$0.9 billion for lost productivity. Ulrich et al. (2003) used the 1998 NVAWS coupled with data from health maintenance organizations (HMOs) to estimate that women who are victims of intimate partner violence have 1.6 times higher estimated medical costs compared to other women.

Studies in the peer reviewed literature have documented per case direct treatment costs for intimate partner violence, but this type of study is only possible for those victims who have contact with the health care system. New & Berliner (2000) found that women who were compensated through the Crime Victims Compensation Program in Washington state averaged \$3 087 for mental health treatment and counselling costs. Wisner et al. (1999) compared women in a large health plan in Minnesota who were victims of intimate partner violence to other women in the plan. The intimate partner violence victims had an annual average of \$4 341 of health care costs, or \$2 120 more on average than other women in the plan.

2.4 Sexual violence

As with intimate partner violence, the costs of sexual assault are difficult to document systematically since many such assaults go unreported. As a result, most documented calculations (see Table 4) are likely to be underestimates.

The Children's Safety Network Economics and Insurance Resource Center (1997) estimated that sexual assault costs \$159 million per year in the USA, with 79% of the costs due to quality of life factors and the remainder accounted for by lost earnings and legal and medical costs. Cohen (1988a), using pain and suffering awards from more than 100 000 jury decisions in the USA, calculated that the annual aggregate direct and indirect costs of rape were \$14.9 billion - equivalent to 0.2% of the gross domestic product. The largest estimate is that of Post et al. (2002), who calculated costs of \$6.5 billion for rape and sexual assault in 1996 in Michigan, or more than \$700 per resident. Scaled-up to the national level, they estimated a total loss of \$261.3 billion, including productivity losses.

Direct treatment costs related to sexual assault are relatively small in comparison. Several studies have used the NCVS, an annual survey based on 100 000 interviews with crime victims, to estimate the incidence and calculate the direct costs of sexual assault to the victims. The United States Department of Justice (1994) calculated the economic losses of rape as \$33 million, based on reported direct medical costs and lost earnings. This estimate, however, did not

include incidents more than 6 months prior to the survey date, nor did it include psychological costs.

Table 4 **Costs of sexual violence - selected studies**

Study	Study location and population	Cost categories included (indirect costs in italics)	Total annual costs (2001 US\$)
Peer reviewed articles and government studies			
Cohen (1988)	US. Pain and suffering awards from more than 100 000 jury decisions	Direct medical, <i>lost earnings and opportunity costs of time, psychological costs, other non-monetary costs</i>	Cost of rape: \$14.9 billion
Miller, Cohen & Rossman (1993)	US National Crime Victimization Survey: all victims of non-fatal physical and psychological injury, 1987-1990	Direct medical, life insurance, victim compensation costs (jury awards), <i>employment and workers' productivity, psychological costs, lost earnings and opportunity costs of time</i>	Cost per rape: \$85 000
US Department of Justice (1994)	US National Crime Victimization Survey	Direct medical, <i>lost earnings and opportunity cost of time</i>	Cost of rape: \$33 million
Studies conducted by advocacy groups			
Children's Safety Network Economics and Insurance Resource Center (1997)	US National Crime Victimization Survey and Survey of State Prison Inmates	Legal services, direct medical, <i>lost earnings, quality of life, and opportunity cost of time</i>	\$159 million
Illinois Coalition Against Sexual Assault (2002)	US	Direct medical, <i>employment and workers' productivity, psychological costs, other non-monetary costs</i>	Cost per rape: \$110 000

For costs at the level of individual rape victims, Miller, Cohen & Rossman (1993) used the NCVS to calculate a total cost of \$85 000 per rape, including physical injuries and psychological harm. They discounted future psychological costs at an annual rate of 2.5%. The Illinois Coalition against Sexual Assault (2002), an advocacy group, calculated that the average sexual assault results in \$110 000 in costs to the victim, including \$500 in medical care, \$2 400 in mental health services, \$2 200 in lost productivity and \$104 900 in undiscounted pain and suffering. Rudmond & Davey (2000) calculated average hospital treatment charges of \$8 387 for victims of sexual assault in 19 states in the USA.

2.5 Workplace violence

Violence at or related to the workplace extracts a significant economic toll (Table 5), but studies of its magnitude are not well developed and are hampered by measurement difficulties and non-standardized methodologies. A study from the

European Union showed a strong relationship between exposure to violence and absenteeism from work. In this study, 35% of workers that reported experiencing physical violence at the workplace also reported missing work in the previous year - compared to 23% of all workers (Paoli, 2000). Henderson (2000) estimated that workplace violence in Australia resulted in costs to employers of \$5 582 per victim and \$837 million annually in damage to the Australian economy.

Table 5 **Costs of workplace violence - selected studies**

Study	Study location and population	Cost categories included (indirect costs in italics)	Total annual costs (2001 US\$)
Peer reviewed articles and government studies			
Biddle & Hartley (2002)	US. All occupational homicide deaths from National Traumatic Occupational Fatalities surveillance system 1980-1997	Direct medical, <i>lost earnings and opportunity costs of time</i>	Cost of workplace homicides: \$970 million
Hashemi & Webster (1998)	US. 600 non-fatal workplace violence claims, randomly selected	Direct medical, <i>lost earnings and opportunity cost of time, employment and workers' productivity, psychological costs, other non-monetary costs</i>	Costs per workplace compensation claim: \$3 694
Studies conducted by advocacy groups			
Hoel, Sparks & Cooper (2001)	Various settings	Direct medical, <i>psychological costs, lost earnings, lost productivity</i>	1.0 to 3.5% GDP

There is a wide range of estimates of how much interpersonal violence-related absenteeism, together with related medical care and productivity losses, costs employers and society in general. The International Labour Organization (Chappell & Di Martino, 2000; Hoel, Sparks & Cooper, 2001) has begun an initiative to document the costs of violence in the workplace and has found a range of estimates from \$4.9 billion to \$43.4 billion in the USA alone. These studies employed a broad definition of workplace violence, including psychological violence such as sexual harassment and bullying. Biddle & Hartley (2002) studied the costs of homicides in the workplace in the USA and calculated an annual cost of approximately \$970 million. This estimate included the lost earnings of victims extrapolated to the age of 67. Hashemi & Webster (1998) reviewed a random sample of non-fatal workplace violence claims filed with a large worker's compensation insurance carrier. They calculated \$26.5 million in annual costs to the insurer, based on 7 173 compensated claims - or \$3 694 per claim. Internationally, a report commissioned by the ILO on the costs of violence and stress in work environments estimated that losses from stress and violence at work represented from 1.0% to 3.5% of the gross domestic product over a range of countries (Hoel, Sparks & Cooper, 2001).

2.6 Youth violence

Youth violence is defined as violence committed by or against individuals between the ages of 10 and 29. In 2000, an estimated 199 000 youth homicides were committed globally - 9.2 per 100 000 people. This rate varied from 0.9 per 100 000 in high-income countries to 17.6 in Africa and 36.4 in Latin America. Based on studies of non-fatal violence, it was further estimated that for every youth homicide there are 20 to 40 victims of non-fatal youth violence receiving hospital treatment (Krug et al., 2002).

Violence committed by juveniles is particularly costly to society (Table 6), but has been the subject of few economic evaluations. Miller, Fisher & Cohen (2001) analysed violent crimes committed in Pennsylvania in 1993, finding that juvenile violence accounted for 24.7% of all violent crimes and 46.6% of the total victim costs from violent crime. Juvenile crime resulted in \$6.6 billion in costs to victims - including quality of life and productivity losses. Cohen (1998b) reviewed the costs of crimes committed by juveniles. He estimated that a typical crime committed by a juvenile resulted in \$16 600 to \$17 700 in costs to the victim, plus \$44 000 in costs to the criminal justice system. Adding these costs to the foregone economic contributions of incarcerated criminals, he calculated that the total cost to society of one youth reverting to a life of crime ranged from \$1.9 to \$2.6 million - based on 68 to 80 crimes committed. Interventions to prevent high-risk youth from becoming career criminals are therefore likely to be highly cost-effective.

Table 6 **Costs of youth violence - selected studies**

Study	Study location and population	Cost categories included (indirect costs in italics)	Total annual costs (2001 US\$)
Peer reviewed articles and government studies			
Cohen (1998)	US. Youth criminals (data from other studies)	Incarceration, direct medical, <i>lost earnings and opportunity costs of time, employment and workers' productivity, psychological costs</i>	Cost per youth resorting to life of crime: \$1.9 million - \$2.6 million
Miller, Fisher & Cohen (2001)	US, Pennsylvania. Violent juvenile crimes committed in Pennsylvania in 1993 (N=93 000); from Federal Bureau of Investigation Uniform Crime Report, Pennsylvania Childline and Abuse Registry, National Crime Victimization Survey, National Incidence Survey on CAN, Pennsylvania arrest data, Childline records	Direct medical, <i>lost earnings and opportunity cost of time, employment and workers' productivity, psychological costs, other non-monetary costs</i>	Cost of youth violence \$6.6 billion

2.7 Guns, drugs and gangs

Although the ecological model views interpersonal violence as an outcome of the interaction between multiple risk factors at societal, community, relationship and individual levels, economic studies have focused on single risk factors. Of

these, access to guns has been subjected to the most extensive investigation, alongside a smaller number of studies examining alcohol, drugs and gangs.

Most estimates of the economic impact of gun violence include suicide. Although suicide falls outside the definition of interpersonal violence used in this document, the estimates in this section include suicide and suicide attempts using guns, since the literature does not separate these cases from other types of gun violence. In the USA, where more than 30 000 people die annually from firearms injuries, there is no question that the overall toll of gun violence is very high. These injuries were the second leading cause of death for individuals aged 15 to 34 (Gunderson, 1999).

Max & Rice (1993) calculated the annual costs of firearm injuries in the USA at \$27.3 billion, including direct medical care and lost productivity with a 6.0% discount rate; 85% of this amount was due to lost productivity. They based their estimates on a variety of sources, including the National Mortality Detail File and the National Medical Care Utilization and Expenditure Survey. Miller & Cohen (1997) included psychological costs and the value of quality of life and arrived at a significantly higher estimate for the toll of gun-related violence in the USA - \$155 billion, or 2.3% of the gross domestic product. They also calculated that, on a per-capita basis, the costs of gun violence in Canada were 36% of the USA figure. Using individuals' expressed willingness to pay for decreases in gun violence, Cook & Ludwig (2000) calculated that gun violence cost \$100 billion a year, including indirect costs such as increased security and psychological effects. Of this amount, \$15 billion was directly related to gun violence against youth (Cook & Ludwig, 2002).

Hospital-based studies have also found a heavy economic toll related to gun violence. In a study of 9 562 patients discharged from California acute care hospitals after treatment for firearm-related injuries, Vassar & Kizer (1996) found mean hospital charges of \$23 187 per patient. Publicly financed insurance paid for 56% of the patients. Similarly, a study in Arkansas in the USA found average direct hospitalization treatment costs of \$33 947 per gunshot victim (Nelson, Puskarich & Marks, 1987). Cook et al. (1999) studied 800 cases of gunshot injuries treated in emergency rooms across the USA. Using discharge information, they calculated average medical costs of \$20 304 per gunshot victim. With a 3.0% discount rate, lifetime medical treatment costs per person amounted to between \$37 000 and \$42 000.

Mock, Pilcher & Maier (1994) studied gunshot wounds at a regional hospital in Seattle in Washington state from 1986 to 1992 and found direct average hospital charges of \$17 367 for gunshot victims, compared to \$7 699 for stab victims. They argued that if guns were eliminated - even if the volume of gunshot wounds was replaced by stab wounds - \$1.5 million would be saved annually at that hospital alone. Of these savings, 76% would be from public sector funds. There were few estimates of the costs of gun violence outside of the USA and Canada.

A study at the Groote Schuur Hospital in Cape Town, South Africa, found that direct medical costs averaged \$10 308 per gunshot victim (Peden & Van der Spuy, 1998). The Gun Control Alliance of South Africa carried out additional analyses and found that these direct medical costs represented just 13% of the total costs of gun violence for victims treated at the Groote Schuur Hospital (Gun Control Alliance, 2002).

Alcohol and drugs were also leading contributors to violence and its costs. According to estimates by the US Children's Safety Network Economics and Insurance Resource Center (1997), the costs of violent crime committed under the influence of alcohol equalled \$33.3 million in 1995, or 8.3% of the cost of all violent crime. At the individual level, Waller, Skelly & Davis (1994) found that alcohol use was a factor in 25% of assaults for victims hospitalized in Vermont, with average hospital charges of \$420 - 19% of which was paid by public sources and 54% of which was unpaid.

Also in the US, crime committed under the influence of drugs, or to obtain money to purchase drugs, amounted to \$103.6 million, or 25.7% of the total for violent crime. These results are based on analysis of the National Crime Victimization Survey and the Survey of State Prison Inmates. The National Crime Prevention Council (1999) estimated that the cost of all drug-related crime, including productivity costs, amounted to between \$60 and \$100 billion annually in the USA. Violent crime accounted for approximately 10% of this figure.

Gangs are described as significant violence facilitators in several studies of the costs of violence (Tellez et al., 1995; Pfizer, 2001). Song et al. (1996) studied the costs incurred by patients suffering from gang-related violence in the University of California at Los Angeles Medical Center. They found 272 cases of gang-related gunshot injuries over a 29-month period from 1992 to 1994. These injuries resulted in an average of \$21 200 in direct medical charges. For 58% of these charges, there was no available insurance or third party reimbursement to pay the bill.

2.8 Effects on public finances

Evidence abounds that the public sector - and thus society in general - bears much of the economic burden of interpersonal violence. This is particularly well documented in the case of gun-related violence. Several studies in the USA showed that from 56% to 80% of the costs of care of acute gun injuries were either directly paid by public financing or were not paid at all - in which case they were absorbed by the government and society in the form of uncompensated care financing and overall higher payment rates.

Public insurance paid for 56% of the patients treated for firearm-related injuries in a study in California acute care hospitals, with an average bill of \$23 187 per patient (Vassar & Kizer, 1996). A separate study at the University of Southern

California Medical Center found that 87% of the costs of treating gunshot wounds of the trunk were paid with public funds - with average hospital stays of 6.8 days and costs of \$10 600 per patient (Payne et al., 1993). Similarly, 80% of the direct medical costs for gunshot wounds, stab wounds and injuries from assault at the San Francisco General Hospital in the mid-1980s were paid for with public funds (Sumner, Mintz & Brown, 1987). In a study of gunshot and stabbing wounds in a metropolitan trauma centre in Los Angeles county in California, the total collection rate for direct medical expenses - averaging \$4 701 per case - was just 22% (Klein et al., 1999). Overall, in the USA, each gunshot victim generated an estimated average of \$9 209 in uncompensated costs (Physicians for Social Responsibility, 2002).

There is similar but less well-documented evidence of the effect of other types of interpersonal violence on public finances. Of the costs of medical care and legal fees for burns suffered by child abuse victims in a study in Ohio, 65% were paid with public funds (Evasovich et al., 1998). Clancy et al. (1994) found that 70% of hospital charges for patients with assault-related penetrating injuries at a major medical centre in North Carolina were not reimbursed. Gunderson (1999) reported that 85% of the medical care costs of gun violence victims in the USA was paid from public sources.

There are fewer figures available internationally concerning the impact of violence on public financing. Most high-income countries have a higher percentage of public financing for health care in general than the USA where 45% of health care costs were paid with public funds (World Bank, 2003). It is therefore likely that the corresponding contribution of the public sector to the costs of violence was higher in these countries than in the studies from the USA cited above.

In low- and middle-income countries, it is also probable that society in general absorbs much of the costs of violence. One study in Jamaica found that 90% of the costs of treating victims of violence at the Kingston Public Hospital - including materials, drugs and doctors' fees - were paid by the government (Mansingh & Ramphal, 1993).

3. Economic effects of interventions to reduce interpersonal violence

There are few published economic evaluations of interventions aimed at preventing interpersonal violence, and most of these are from the USA. Given the overwhelming evidence of the high costs of interpersonal violence, more detailed analysis of feasible interventions is a clear research priority. This type of economic evaluation is methodologically complex. Measuring costs, benefits and effectiveness in standardized and comparable ways requires a standard and commonly accepted template for doing so (Barnett, 1993). Because the prevalence of the underlying condition - that is, interpersonal violence - is generally not well established and in many cases reporting is subject to social taboos, it is difficult to document both the potential effects of interventions in reducing violence and also the monetary benefits that would accompany such a reduction. Studies of interventions differ widely in the methodologies applied and the costs included, making direct comparisons essentially impossible. All of the available studies have shown, however, that behavioural, legal and regulatory interventions cost less than the money that they save, in some cases by several orders of magnitude (Table 7).

Table 7 **Economic evaluations of interventions to reduce interpersonal violence - selected studies**

Study	Study location and population	Cost categories included (indirect costs in <i>italics</i>)	Total annual costs (2001 US\$)
Peer reviewed articles and government studies			
Armstrong (1983)	US, Pennsylvania, 1979. Child abuse prevention: home-based counselling and neighbourhood support groups, based on 103 at-risk children	Direct medical, foster care, intervention costs	Annual costs that would occur in the absence of intervention: \$1 182 000; annual costs of running programme for 1 year: \$419 000; net savings per year (not all outcomes avoided despite intervention): \$647 000
Caldwell (1992)	US, Michigan. Child abuse prevention programmes	Direct medical, incarceration, policing (protective services), <i>lost earnings (taxable income)</i> , <i>opportunity cost</i> , <i>lost investments in human capital</i> , <i>psychological costs</i>	Cost of home visitor prevention programme to every family having first baby: \$70.6 million; Cost of parent education programme: \$35.2 million; prevention costs are 1/19th of child abuse costs

Study	Study location and population	Cost categories included (indirect costs in italics)	Total annual costs (2001 US\$)
Peer reviewed articles and government studies			
Chapdelaine & Maurice (1996)	Canada. Compares costs of universal licensing and registration of guns with the benefits	Direct medical, <i>productivity costs</i>	Cost of universal licensing and registration system: \$70 million; annual direct cost of firearm-related injury to the health care system: \$50 million; total cost of firearm-related injury in Canada: \$5.6 billion (Miller 1995)
Daley et al. (2000)	US, Massachusetts, 1998. Substance abuse treatment for 439 pregnant women	Legal services, medical, policing, incarceration, other monetary costs (value of stolen property), <i>lost earnings, productivity</i>	Net gain in terms of reduced crime per year per woman treated: \$11 816
Olds et al. (1986); Olds & Kitzman (1993)	US. Elmira Prenatal/Early Infancy Project	Programme costs, reduction in health services, welfare, criminal justice system, <i>taxes</i>	Public sector savings per child: \$27 854; costs of \$6861 and benefits of \$20 993 (project lifetime)
Studies conducted by advocacy groups			
Aos et al. (2001)	US comparative costs and benefits of crime prevention programmes.	Direct medical	Net benefits per participant (lower range includes public sector benefits; upper end includes public sector and victim costs): Mentoring: \$231-\$4 651; family therapy: \$14 545-\$60 721; aggression replacement therapy: \$8 519-\$34 071; intensive probation as alternative to incarceration: \$19 106-\$19 382
Chanley, Chanley & Campbell (2001)	US, Arizona. Economic impact of shelters for victims of domestic violence.	Costs and benefits of refuge shelters for victims of domestic violence	Net social gain of \$3.4 million; benefit to cost ratio ranging from 6.8 to 18.4
Donato & Shanahan (1999)	Australia. Costs of benefits of a hypothetical in-prison sex offender treatment programme	Costs of incarceration, <i>psychological costs, other non-monetary costs</i>	Costs per sex offense: \$105 324; net savings per offender: \$26 698
Greenwood et al. (1996)	US. Comparison of interventions to reduce child crime	Programme (intervention) costs only	Parent training and graduation incentives 5-7 times more cost-effective in achieving 10% crime reduction than increased incarceration.

Several of the studies done in the USA have focused on programmes to reduce child abuse. Dubowitz (1990) reviewed four different interventions involving counselling and therapy for families at high risk of child abuse. The programmes cost between \$299 and \$2 927 per family treated per year, with no comparisons made of their financial benefits. Caldwell (1992) estimated that the cost of child abuse and neglect in Michigan was \$1.0 billion a year, including the costs of crime and incarceration committed by the victims of child abuse later in life. On the other hand, he calculated that a home visitor prevention programme for every family in the state when they have their first baby would cost \$70.6 million. A comprehensive parent education programme would cost \$35.2 million and a prevention programme combining both home visits and parent education would cost \$52.9 million. Prevention costs are just one-nineteenth of the cost of child abuse. This direct comparison implicitly assumed that the prevention programmes would eliminate child abuse.

Armstrong (1983) carried out a cost-benefit analysis of a child abuse prevention programme in Yeardon in Pennsylvania. The programme involved home-based counselling and neighbourhood support groups. The study followed 103 children considered to be at-risk for child abuse and neglect. Based on probabilities of adverse outcomes from the literature - including the need for outpatient care, hospitalization, foster care and special education services - the study concluded that \$1.2 million in costs to society were prevented by the programme, for a net savings of \$647 000 per year and a benefit to cost ratio of 1.86. Similarly, the Prenatal/Early Infancy Project - a home visit programme for high-risk families in Elmira in New York state - was found to generate significant savings for the government. Including programme costs, reduced health and social service use, savings to the criminal justice system and additional taxes, the programme resulted in overall public sector savings of \$27 854 per child (Olds et al., 1986; Olds & Kitzman, 1993). Karoly et al. (1998) published a different estimate, finding that the Elmira Prenatal/Early Infancy Project cost the public sector \$6 550 per participant while generating savings to the government of \$26 200, for a net savings of \$19 650 per participant.

A similar programme at Perry Pre-school in Michigan that enrolled 123 disadvantaged African American children and included weekly home visits by teachers resulted in net savings to the government of \$13 100 per participant. Olds et al. (1999) also studied nurse home visitation programmes through randomized trials in Elmira and in Memphis in Tennessee and found that these programmes helped reduce rates of childhood injuries that may be associated with child abuse and neglect.

In Canada, Chapdelaine & Maurice (1996) quantified the costs of the benefits of a law regulating firearm ownership. The law required that all gun owners register and license their guns by 1 January 2001. The cost of implementing a universal licensing and registration system was estimated to be \$70 million -

most of which accrues on a one-time basis - compared to annual direct costs of gun-related violence of \$50 million to the Canadian health care system. When the indirect costs of gun violence were included, the economic benefits of the law were much clearer. The total costs of firearm-related injuries in Canada were calculated by Miller (1995) to be \$5.6 billion - including lost productivity and psychological costs.

Greenwood et al. (1996) compared different interventions to reduce youth crime in the USA. They found that providing high school students with incentives to graduate, which cost \$14 100 per programme participant, was the most cost-effective intervention - resulting in an estimated 258 serious crimes prevented per \$1 million spent. Parent training prevented 157 serious crimes per \$1 million, compared to 72 for delinquent supervision programmes and 11 for home visits and day care. All of these interventions, with the exception of home visits, were found to be more cost-effective than the enforcement of California's "three strikes and you're out" law that incarcerates individuals for 25 years to life who are convicted of three serious crimes. A separate analysis suggested that incarceration of juveniles cost \$25 650 compared to benefits - in terms of crimes prevented - of \$1 140 over a period of 4 years (Fass & Pi, 2002).

Aos et al. (2001) compared the net benefits of a range of programmes to benefit troubled youths. The most effective programmes were mentoring (with net benefits ranging from \$231 to \$4 651 per participant), family therapy (\$14 545 to \$60 721) and aggression replacement therapy (\$8 519 to \$34 071). Once again, incarceration was not found to be cost-effective, by contrast intensive probation as an alternative to imprisonment gained \$19 106 to \$19 382 in net benefits.

Other relevant studies looked at the costs and benefits of an injury surveillance system, a substance abuse treatment programme, alcohol taxes, a prison sex offender counselling programme and California's "three strikes" law. Wilt & Gabrel (1998) estimated that a weapons-related injury surveillance system in New York city would cost less than \$60 000 per year and would provide useful information and data to inform strategies for reducing violence.

Daley et al. (2000) studied the impact of a substance abuse treatment programme on 439 pregnant women enrolled in detoxification facilities in Massachusetts. The total average cost of the intervention - including in-residence and subsequent outpatient treatment - was \$1 665 for a 30-day stay. They valued corresponding reductions in criminal activity at \$11 816 per participant per year - for a benefit to cost ratio of 8.1 assuming that the participant used the facility for only one 30-day period. The study included reductions in all types of crime, not just violent crime, in the benefits. In

multivariate linear regression, in-residence treatment was the most effective treatment modality, associated with highly statistically significant reductions in criminal activity.

Markowitz & Grossman (1998) used an economic model to predict the effects on violence of increasing alcohol taxes. They found that a 1.0% increase in the tax on beer reduced the number of acts of violence by an average of 0.16% - a price elasticity of -0.16. Greenwood et al. (1994) analysed the economic effects of California's 1994 "three strikes and you're out" law - which mandated that criminals with two previous serious felonies would receive a prison sentence of 25 years to life for any type of a third felony. Studying data on arrest rates, time service, prison populations and crime trends, they found that the extra costs of implementing the law would be \$4.5 billion to \$6.5 billion per year. At the same time, an estimated 85% of the law's effectiveness in curbing crime could be achieved by the first two "strikes" alone, without the mandatory sentencing provisions for the third felony.

Donato & Shanahan (1999) modelled the effects of an in-prison sex-offender treatment programme in Australia. Using data from similar programmes active in New Zealand and Australia, they found that the effectiveness of the programme depended on the rate of repeat sex crimes once the offenders were released. Their estimates ranged from a cost-benefit ratio of 5.0 (with 14% recidivism) to 0.7 (with 25% recidivism). Overall, they estimated that the programme would be effective, resulting in \$26 698 in net savings per offender treated. They included incarceration and psychological costs that were prevented due to the programme.

There were very few studies available of the economic impact of interventions designed to reduce intimate partner violence. Chanley, Chanley & Campbell (2001) estimated that providing shelters for victims of domestic violence in Arizona resulted in a net social benefit of \$3.4 million annually, for a benefit to cost ratio between 6.8 and 18.4. Clark, Biddle & Martin (2002) carried out a cost-benefit analysis of the 1994 Violence Against Women Act in the USA, which provided for severe criminal penalties against stalkers and perpetrators of intimate partner violence. They found that the law resulted in a net benefit of \$16.4 billion, including \$14.8 billion in averted victim's costs. Jones (2000) estimated the direct costs of counselling programmes for perpetrators of intimate partner violence ranged from \$304 to \$725 per perpetrator; however, the corresponding effectiveness of these programmes is not known.

Miller & Levy (2000) estimated cost-outcome ratios for a wide range of interventions to reduce injuries, including violent injuries, in New York state. The most effective interventions were those that focused on juvenile offenders -

including aggression replacement training and foster care treatment, with benefit to cost ratios of 90 and 65, respectively. They found that a wide range of potential interventions targeting non-offenders, juvenile offenders, and adult offenders benefited society from the cost-benefit perspective and, once benefits were subtracted from costs, resulted in cost per QALY ratios below zero.

4. Effects of economic factors and policies on interpersonal violence

This chapter discusses findings related to the effects of economic conditions and policies on interpersonal violence. As described in the introductory conceptual framework, society- and community-level risk factors for interpersonal violence include economic inequality, poverty, weak economic safety nets and unemployment. In addition, these can also be influenced by interpersonal violence. For example, increasing levels of violence may contribute to social and geographic distributions of investments that could leave the poor worse off. Thus, it is often difficult to tease out the cause and effect relationships of these variables in the available literature.

The relationship between economic conditions and interpersonal violence has been the focus of extensive study in fields such as sociology, criminology, macroeconomics and development studies, and it was not possible to summarize all such information in this report. Instead, this report focuses upon the more limited contemporary public health and health economic literature dealing with this relationship (Table 8).

Table 8 **Selected studies exploring the relationship between economic factors and interpersonal violence**

Study	Background risk factors	Type(s) of interpersonal violence
Peer reviewed articles and government studies		
Blau & Blau (1982)	Economic inequality, poverty, race (black)	Stranger sexual assault, other violent crime
Butchart & Engstrom (2002)	Economic development, income inequality, female labour force participation	Homicide in 0-24 year age-group – 61 countries
Devine, Sheley & Smith (1988)	Unemployment, inflation, prison rate, relief	Homicide, robbery, burglary in US 1948-1985
Engstrom, Diderichsen & Laflamme (2002)	Family of origin social and economic status	Homicide and non-fatal violent injuries involving hospitalisation
Fajnzylber, Lederman & Loayza (2000)	Average income, income inequality	Homicide and robbery rates in countries
Fiala & LaFree (1988)	Inequality, unemployment, female status, female labour force participation	Child homicide
Kaplan et al. (1996)	Income inequality	Homicide (all mortality) in US
Kawachi, Kennedy & Wilkinson (1999)	Income inequality	Homicide, assault, robbery (and property crime) in US
Kennedy et al. (1998)	Income inequality	Homicide, firearm crime, robbery, assault in US

Study	Background risk factors	Type(s) of interpersonal violence
Peer reviewed articles and government studies		
Lester et al. (1992)	Unemployment, female labour force	Homicide - US and Japan
Messner (1989)	Economic inequality (economic discrimination), decreased social capital	Homicide – 52 countries
Shihadeh & Ousey (1998)	Low skill, entry level employment	Homicide – US
Szwarcwald et al. (1999)	Income inequality	Homicide in Rio de Janeiro, Brazil
Unnithan & Whitt (1992)	Inequality, economic development	Homicide – 31 countries
Studies conducted by governments and international organizations		
Buvinic M, Morrison AR & Shifter M (1999)	Economic inequality, poverty, weak economic safety nets, unemployment, matriculation, childhood abuse, exposure to violence, decreased social capital	Intimate partner violence, other violent crime
Doyal L & Nandy S (1999)	Social class (UK), income levels	Intimate partner violence, child homicides
Gaviria A & Velez CE (2001)	Matriculation, age, poverty	Intimate partner violence, other violent crime
Glaeser EL (1999)	Unemployment, poverty, and opportunity cost of crime	Other violent crime
Gonzales de Olarte E & Llosa PG (1999)	Poverty, weak economic safety nets, unemployment, age (24-54 years)	Intimate partner violence
Gracheva V. (1999)	Economic inequality, poverty, weak economic safety net, unemployment, childhood abuse, exposure to violence, gender (F)	Intimate partner violence, child abuse, stranger sexual violence
Markowitz S (2000)	Poverty, unemployment (greater chance of being victim)	Stranger sexual assault, other violent crime

4.1 Absolute income levels and interpersonal violence

Poverty has been explored in the literature as a cause and consequence of interpersonal violence. It can directly cause violence, or it can create the conditions in which those predisposed to violence will become violent. In terms of the ecological model, poverty has mostly been explored as a societal-level risk factor for interpersonal violence, although some studies have also examined its effects at the individual and relationship or household levels.

Gonzales de Olarte & Llosa (1999) explored the relationship between poverty and domestic violence by interviewing 359 women in Lima, Peru. They demonstrated that the percentage of poor women - based on the National Living Standards Survey - who suffered domestic violence was higher than the percentage of non-poor women. They concluded that "poverty seems to be an aggravating factor in all types of violence", especially domestic violence.

Morrison & Biehl (1999) showed that abused women in Chile had a lower probability of working (and earning) outside the home and earned lower wages than non-abused women. Thus, domestic violence has the potential to negatively

affect wages but the effect is not statistically significant or consistent across countries.

Gaviria & Velez (2001) studied the burden of crime and violence in Colombia using a number of large-scale surveys covering about 40% of the national population. They concluded that the greatest burden of crime (mainly property crime) and investments for crime prevention was on the wealthy, the greatest burden of homicides was on the poor, and the greatest burden of domestic violence was on poor, uneducated women.

Glaeser (1999) reviewed the Becker model of crime (Becker, 1993) and described how unemployment and poverty can create conditions that reduce the opportunity cost of crime. Several of the multi-country analyses reviewed in this Chapter's section on income inequality describe the strong association with inequality compared to the weaker association of violent crime with absolute levels of poverty. This makes the consideration of both factors - absolute and relative poverty - important in the economic analysis of interpersonal violence.

4.2 Employment and social networks

Gracheva (1999) documented an analysis of the socioeconomic factors leading to an increasingly violent society in Russia and explored male on female violence. The paper discussed how post-Communist economic reform removed economic safety nets and caused financial crises for those who depended on them. Thus, the absolute numbers of people in poverty increased, and there was a concomitant inequality developing in the society. These changes were accompanied by an increase in the levels of other existing risk factors (such as alcohol and drug abuse), to make for a high-risk, high-violence society leading to a situation where 20% of female deaths were caused by domestic violence, and 75% of all rapes occurred under the influence of alcohol.

Contrary to studies showing greater levels of interpersonal violence among the unemployed, Gonzales de Olarte & Llosa (1999) showed in their analysis of data from Peru that men who were employed inflicted more violence than men who were unemployed. They also showed a positive correlation between social support networks and increased subjection of violence. However, no satisfactory explanation of these findings was given although issues of cause and effect were raised by the finding of these associations.

The sociological literature also provided insights into the complexity of such relationships, but usually with crime as the outcome of study. Devine, Sheley & Smith (1988) tested a model of economic distress (unemployment, inflation), social control policies (imprisonment, deterrence, control) and changes in the rate of crime using USA time series data covering a 40-year period. They concluded that unemployment motivated crime, but that theories exploring the relationship between macroeconomic determinants and crime must also evaluate social control policy issues. Explorations of child homicide rates across countries (Fiala & LaFree, 1988) also demonstrated the impact of women's

status accompanied by economic stress in its causation. However, Fiala & LaFree studied the variation in child homicides mainly across more developed countries, so could not provide the same explanation for less developed countries.

Exploring macrosocial links in the employment-violence linkage, Shihadeh & Ousey (1998) studied the links between low-skill, entry-level employment in cities and rates of homicide. They evaluated the decline in the availability of such employment in urban centres of the USA with populations of at least 100 000 (and at least 5 000 blacks) from 1970 to 1990 and found that this corresponded with increased homicide rates. Moreover, this association was true for both white and black populations, although the rates of homicides were different in both groups. They discussed how the loss of specific jobs created economic deprivation, which in turn exerted an upward pressure on rates of violent crime.

4.3 Income inequalities

Studies on income inequality as a societal- and community-level risk factor for violence have focused almost exclusively on homicide (Table 8). The association between inequality and homicide has a set of intervening factors such as unemployment, economic deprivation, frustration and social disintegration, making for a complex relationship.

Messner (1989) studied the relationship between homicide and income inequalities in 52 non-Communist countries using a mix of data from police (Interpol) and WHO cause of death statistics for the base year of 1980. The purpose was to look at associations between homicide rates in countries and measures of economic inequality and discrimination (a composite variable was derived for the latter), while controlling for a number of other health and economic factors that could have influenced the findings. The composite variable for economic discrimination was strongly associated with homicide rates, and more so than income inequality (income data used in the analysis stemmed from 1960 to 1970). In another 1980s study, Blau & Blau (1982) used the 1970 USA census data from 125 of the largest metropolitan areas to look at the association between urban violent crime (stranger sexual assault and other violent crime) and a number of variables capturing aspects of economic inequality (racial percentage, poverty, income inequality). They concluded that socioeconomic inequalities drove the effect of other factors such as poverty, race and geographical location on violence. This provided a useful reference for arguing that inequality rather than absolute deprivation produced by poverty was a risk factor for interpersonal violence.

In exploring the relationship between homicide, inequality and economic development, Unnithan & Whitt (1992) studied data from 31 nations for homicides and concluded that inequality was a better predictor of violence than economic development. Homicide rates were found to decrease with development, independent of inequality, but increasing inequality was found to

predispose to more lethal violence. Kaplan et al. (1996) also explored data from the USA (state-level data) and found that rates of homicides and violent crime were strongly associated with income inequality. In addition, unemployment was found to be associated with income inequality.

Exploring data from 50 USA states for homicide rates (1987-1991) and firearm robbery and assault (1991-1994), Kennedy et al. (1998) demonstrated that income inequality was strongly correlated with firearm violent crime. This effect was significant when the impact of poverty was controlled, again reflecting that income differentials had a greater effect on violence than absolute levels of poverty. In a further analysis of this data, Kawachi, Kennedy & Wilkinson (1999) showed that income inequality as a measure of relative deprivation was consistently associated with violent crimes. Meanwhile, poverty and homicide demonstrated only a weak relationship.

Data from non-USA studies was uncommon, but Gracheva (1999) identified economic inequality as a contributory factor to increased levels of interpersonal violence in the post-Soviet Russian Federation. Gaviria & Velez (2001) concluded that there was mixed evidence showing poverty and inequality to be among the risk factors underlying violence in Colombia, since although inequality was positively correlated with violence, it explained only a small fraction of the overall municipal variation in violence in Colombia.

Fajnzylber, Lederman & Loayza (2000) studied the economic causes of violent crime with special attention to income inequality adjusted for the effects of other variables closely linked to it. They found that not only was income inequality significantly associated with violent crime, but that the rate of poverty alleviation was also a significant determinant.

Butchart & Engstrom (2002) explored the relationship between economic development (gross domestic product, percentage increase in gross national product), economic inequalities (measured by Gini coefficients and female economic activity as a percentage of male economic activity) and homicide rates in children and youth (0-24 years). They studied data from 61 countries from the year 1994, based on age- and sex-specific homicide rates, and evaluated associations with national economic development and inequality. The association between economic inequality and homicide rates was not consistent across ages or sex; in general being stronger for youth and males. Inequality and homicides in young males displayed a stronger relationship in the context of low national economic development - as defined by low the gross domestic product - as compared to higher national economic development.

Engstrom, Diderichsen & Laflamme (2002) examined socioeconomic differences in self-inflicted and interpersonal violent injuries among children and adolescents under 20 years old living in Sweden between 1990 and 1994. Using cross-sectional data, they demonstrated an increasing relative risk of such injuries in the 10-14 and 15-19 year-old age groups by decreasing

socioeconomic status. The relative differences between socioeconomic groups were found to be more important for these intentional injuries than for unintentional injuries. However, such differential risks were reduced after controlling for factors such as single parent household, country of birth of parent and receipt of welfare benefits in the case of self-inflicted injuries. Further analysis revealed that receipt of welfare benefits was most strongly correlated with an increase in relative risk of interpersonal violent injuries, especially in girls (Engstrom, Diderichsen & Laflamme, in press). Most interestingly, this also translated to high population attributable risks such that the risk of violent injuries could be reduced by up to 30% if adolescents in families receiving welfare benefits lived under the same circumstances as those with families not receiving such benefits.

In a non-systematic review of data from the United Kingdom, Doyal & Nandy (1999) quoted data from the 1996 British Crime Survey that the proportion of women assaulted in the past year was highest in low-income households. Additionally, households headed by women who had separated from their partners, especially those with children, were found to be at higher risk of violence. Such differentials were pronounced in the case of child homicide rates that were found to differ 17 times between the lowest (social class V) and the highest (social class I) socioeconomic group in the United Kingdom.

Except for Latin America, data from the developing world on this issue was scarce. Szwarcwald et al. (1999) presented findings from the city and state of Rio de Janeiro in Brazil. Results for Rio de Janeiro city reflected a strong correlation between indicators of income inequality and homicide rates, especially in young people. The highest homicide rates were in those areas of the city with the greatest proportions of income inequality and slum residents. However, when data for the different municipalities of Rio state were examined, such an association was not found and the authors suggested that varying levels of urban development between the municipalities of Rio state might explain this finding.

4.4 Inter-generational effects

Concern for the impact of existing patterns of violence and risk factors at the societal, community and relationship levels on younger people has been expressed in the economic literature. Gracheva (1999) documented the strong current "culture of violence" and the increased proclivity for violence in the younger generation of Latin America. Pernanen (undated) discussed the far-reaching impact of alcohol on all types of violence - murder, rape, assault, suicide - and the role of alcohol on initiating and sustaining "criminal careers" in the young.

Buvinic, Morrison & Shifter (1999) focused on issues related to the "learning of aggression" by the young in a society and highlighted the role of observing violence in the home, in the community, the role of the media, cultural perceptions of violence and the impact of educational levels. They also stressed

the role of the education system in responding to this intersectoral issue. In addition, in their definition of the socioeconomic costs of violence they included "intergenerational productivity impacts" (due to grade repetition and lower educational attainment) - which formally accounted for some of the intergenerational issues in interpersonal violence.

4.5 Policy responses

There is limited empirical information on the nature, process and implementation of policy options for preventing or controlling interpersonal violence. The large economic costs of interpersonal violence, as demonstrated in previous chapters, are significant as a rationale for any policy decision that can stop the cycle of violence. On the other hand, any policy that exacerbates or reinforces the risk factors for violence is detrimental.

An understanding of the pathways linking economic conditions and interpersonal violence suggests that effective interventions will necessarily involve removal of the economic conditions - poverty, inequality - that increase the risk of interpersonal violence. In addition to these societal-level changes, interventions at the community and relationship levels are also considered. Butchart & Engstrom (2002) analyzed data from 61 countries to show that redistribution of wealth has potentially different effects on homicide rates in low-versus high-income nations. Improving inequalities alone may lower homicide rates much less than improving inequalities in conjunction with increasing the level of national economic development. Additionally, such policies may have a differential impact on specific age groups.

At the level of specific interventions, Markowitz (2000) used data from the 1992-1994 National Crime Victimization Surveys in the USA to explore the relationship between individual-level patterns of alcohol and drug consumption and violence in the context of poverty and unemployment. It was concluded that higher beer and cocaine prices led to a decrease in assaults and robbery, but not necessarily in other crimes. Fajnzylber, Lederman & Loayza (2000), based on their analysis of economic factors and violent crime, stated that crime fighting strategies work better when crime rates are low thus early warning signs are important, reduction in expenditures geared towards the police are detrimental, and economic growth and poverty alleviation lead to less crime. In addition, they also pointed out the benefits of policy responses in the fields of education, drug trade and other social sectors and their impact on reducing crime.

4.6 Future directions in exploring the role of economic factors in interpersonal violence

The information reviewed in this section shows that the studies exploring the relationship between economic conditions and interpersonal violence are varied and provide different levels of evidence. One issue of importance is the challenge to move from associations to causative relationships where the multiple attributes of an association make it difficult to predict cause and effect. These

studies have demonstrated the strong associations between absolute and relative poverty (income inequality) on specific measures of violence. They do not demonstrate either the pathways through which these relationships exert their influences or the change in the rates of violence as a result of specific interventions in the economic conditions of countries.

With some exceptions, few sex- and gender-specific analyses evaluated the potential differential impact of similar risk factors on males and females. Another concern was the lack of standardized definitions and methods used in the various studies - an issue for further research in order to improve the comparability of findings. In this respect, Glaeser (1999) presented a useful review of the models for evaluating crime and punishment and evaluated the importance of different methodological approaches to the economic study of violence.

The extent to which relationships identified in one country or setting apply equally well in others also has not been the focus of research. Furthermore, most of the research has been done in the USA. International and intercultural studies have not been the focus of empirical exploration except for the use of data from the developed world, and even there differences between high-income countries have been established as well (Lester, Motohashi & Yang, 1992). This review does not look at the relationship between economic conditions and workplace violence - an issue that could be of substantial importance in the developing world.

Interpersonal violence is a deep-rooted phenomenon that, like other social phenomena, is influenced by a wide spectrum of causes at societal, community, relationship and individual levels. Interpersonal violence may therefore also be closely related to globalization in so far as the latter impacts on economic and social processes at the national and regional levels. The complexity of the phenomenon, and the lack of global evidence, is the very reason why an active research agenda must be implemented in the health and social sectors, especially in developing countries.

5. Conclusion

This report has reviewed the literature related to the economic causes and consequences of interpersonal violence. The literature varied both in terms of the subject matter addressed and the methodologies employed. This concluding section of the report identifies the main areas of difference among the studies and important gaps in existing research, and points the way forward to a preliminary research agenda that would standardize definitions, concepts and methodologies across economic, cultural and social settings.

5.1 Methodological issues

The most evident methodological difference among studies of the economic effects of interpersonal violence was the broad range of categories of costs employed. Many of the differences in economic estimates were due to the inclusion or exclusion of specific categories of costs, rather than to different approaches towards counting costs.

Another significant difference among studies was the perspective from which costs were calculated. The majority of studies used a societal perspective - in principle including all costs and benefits. Several studies, however, included only costs to the victims, without counting the social costs of prevention, law enforcement, incarceration and lost productivity. Additionally, the rate used to discount future costs and benefits ranged from 2.0% to 10% among the studies reported here (see Chapter 1 for more detail).

There are several other important methodological issues that differed across the studies reviewed in this report. Principal among these were the values assigned to human life, lost productive time and psychological distress. The value of life has been calculated using lost wages, estimates of the quality of life, wage premiums for risky jobs, willingness to pay for safety measures and individual behaviours related to safety measures. The values used among studies based in the USA ranged from \$3.1 million to \$6.8 million (Box 1).

Quantification of the economic costs in terms of lost human capital is the predominant approach towards the economic evaluation of interpersonal violence and other public health problems and interventions - but this technique is not uncontroversial. By valuing lost time, whether due to incapacitation or to mortality, in terms of potential earnings lost the human capital approach applies a free market to value human life. As a consequence, in a straight comparison, violence that kills or maims residents of high-income countries would be

considered more economically harmful than the equivalent violence in low-income countries. The ethical implications of this type of calculus are beyond the scope of this report, but there is clearly room for inclusion of other principles in placing a value on human life. Some of the studies reported here included the concept of pain and suffering, which seeks to place a value on losses beyond a strictly economic assessment of the value of time.

5.2 Gaps in the literature and directions for future research

Given the wide range of methodological differences and extensive gaps in the existing literature on the economics of interpersonal violence, there is a clear need for systematic future research into the costs of violence. Such research should follow rigorous methodological guidelines, include both direct and indirect cost categories, and - perhaps most importantly - permit comparisons across countries and settings.

Within the context of calculating the economic consequences of violence, the clearest gap is the need for a standardized methodology. Such a methodology would specify parameters for categories and types of costs that should be included - both direct and indirect - as well as the appropriate time frame for calculating costs from the individual and social perspectives. The methodology would apply a consistent rate to discount future costs and benefits. Perhaps most importantly, the methodology would provide a means for comparing the value of losses caused by interpersonal violence across countries and across different economies where the human capital approach is particularly ineffective.

There is likewise a need for standardized research on the indirect costs of violence. Beyond the individual consequences of opportunity cost and pain and suffering, interpersonal violence has a series of economic effects at the population level, including reduced foreign investment and lowered confidence in society's economic, legal and social structures. There are very few estimates of the extent of these costs, which, if quantified, are likely to be several times the value of the direct costs of violence.

This report also shows a worrisome lack of research for specific types of violence - such as elder abuse - and for all types of interpersonal violence in low- and middle-income countries. The great majority of the existing documented studies of the economic causes and effects of violence are from high-income countries, and particularly the USA. Future research should prioritize the documentation of the considerable costs of interpersonal violence in low- and middle-income countries.

There is also a dearth of studies and analyses that permit causal inferences to be drawn regarding the links between interpersonal violence and economic inequality, weak safety nets, unemployment and poverty. It can safely be said that these factors contribute to the amount of interpersonal violence. What is not

clear is the strength of these associations, their causative relationships and how these may vary across countries and regions. The lack of such studies from low- and middle-income countries is again significant, as is the strong focus on homicide for most of the cross-national studies in high-income nations and the paucity of studies that examine the sex- and age-related patterns of these relationships. This provides a major research agenda for joint research by the economic and health sectors.

Finally, there are relatively few published economic evaluations of interventions targeting interpersonal violence. Available studies show that preventive interventions cost less than the money that they save, in some cases by several orders of magnitude, but more research is needed to document the results of effective interventions. Additionally, more attention should be given to identifying and promoting proven policy options to prevent interpersonal violence.

This report has approached the problem of interpersonal violence from the perspective of public health economics. Categorizing and comparing existing documentation of the economic causes and consequences of violence is an enormous task; this report marks an initial effort to make sense of the existing literature and point out directions for future research. The report also underlines the limitations to a purely economic approach towards assessing the effects of violence. Public health economics provides important tools for documenting and quantifying the causes and consequences of violence. However, efforts to promote the prevention of violence in different settings require a multidisciplinary approach including economics, epidemiology, sociology, anthropology, the biomedical sciences and - ultimately - public policy. This report has shown that an economic approach can convincingly demonstrate the magnitude of the damage caused by interpersonal violence - an important first step towards a unified agenda to reduce the vast human toll caused by unnecessary violence between individuals around the world.

Appendix 1

Types of cost evaluations

The major types of cost evaluations reviewed in this document are as follows:

- ▶ **Cost-Benefit Analysis (CBA):** provides information on both the costs of the intervention and the benefits, expressed in monetary terms. Some of the CBA studies provide information only on the net savings, without providing details on the levels of costs and benefits. Other CBA-type studies provide information only on the monetary benefits or savings from an intervention without calculating the cost. A subset of these studies uses willingness-to-pay methods to calculate individuals' and society's aversion to interpersonal violence.
- ▶ **Cost-Effectiveness Analysis (CEA):** provides information on the cost of the intervention and its effectiveness, where effectiveness is not expressed in monetary terms but rather by a defined metric - generally the cost per life saved in the case of interventions to reduce interpersonal violence. CEA studies are in principle directly comparable if they use the same metric and the same methodologies in calculating costs.
- ▶ **Cost-Utility Analysis (CUA):** similar to CEA, but the metric in the denominator is adjusted for quality of life or utility. CUA studies typically used quality adjusted life years (QALYs) or disability adjusted life years (DALYs) as their metric.
- ▶ **Costs only:** no effectiveness or benefit information included.

Appendix 2

Electronic databases and web sites searched

Electronic databases

- ▶ CIAO - Columbia International Affairs Online
- ▶ CINAHL
- ▶ Cochrane Library
- ▶ Contemporary Women's Issues
- ▶ EconLit
- ▶ General Sciences database
- ▶ Index to United Nations Documents and Publications
- ▶ National Clearinghouse on Child Abuse and Neglect Information
- ▶ PAIS
- ▶ Popline
- ▶ Pubmed
- ▶ Social Sciences Citation Index
- ▶ Social Sciences Abstracts
- ▶ Sociological Abstracts
- ▶ SourceOECD

Web sites

Australian Institute of Criminology
www.aic.gov.au

Gun Control Alliance (South Africa)
www.gca.org.za

Health Canada
www.hc-sc.gc.ca

Illinois Coalition Against Sexual Assault (USA)
www.icasa.org

Inter-American Development Bank
www.iadb.org

International Labour Organisation
www.ilo.org

National Crime Prevention Council (USA)

www.ncpc.org/

New Zealand Ministry of Justice

www.justice.govt.nz

Physicians for Social Responsibility

www.psr.org

Prevent Child Abuse America

www.preventchildabuse.org

United States Department of Justice

www.usdoj.gov

Womankind Worldwide

www.womankind.org.uk

Women's Advocates Inc. (USA)

www.wadvocates.org

World Bank

www.worldbank.org

World Health Organization

www.who.int

Appendix 3

Categories used to abstract literature

- ▶ Title and source
- ▶ Background risk factors
- ▶ Proximate risk factors / violence facilitators
- ▶ Types of interpersonal violence
- ▶ Types of interventions
- ▶ Peer reviewed or not
- ▶ Intervention or documentation of costs only
- ▶ If intervention, type of intervention
- ▶ Country, location and population
- ▶ Comparison group if intervention
- ▶ Year of costs
- ▶ Currency
- ▶ Discount rate
- ▶ Type of cost evaluation (CEA, CBA, CUA, costs only)
- ▶ Perspective for costs: individual, societal, legal system, public health system
- ▶ Categories of costs included (see below)
- ▶ Amounts of costs (per category)
- ▶ Timeframe for costs
- ▶ Cost of intervention:
 - total
 - per unit (and unit type for costs)
- ▶ Benefits of intervention:
 - reduction in direct costs (includes medical costs)
 - reduction in indirect costs (includes productivity and opportunity costs)
- ▶ Outcome of intervention (and unit type for outcome)
- ▶ Cost-benefit ratio
- ▶ Value of life or life-year used
- ▶ Cost-effectiveness ratio
- ▶ QALY / DALY weights used
- ▶ Sensitivity analysis
- ▶ Comments

References

- Aos S et al. (2001).** *The comparative costs and benefits of programs to reduce crime.* Washington, DC, Washington State Institute for Public Policy.
- Armstrong KA (1983).** Economic analysis of a child abuse program. *Child Welfare*, 62:3-13.
- Australian Institute of Criminology (2001).** *Australian crime - facts and figures 2002.* (<http://www.aic.gov.au/publications/facts/2001/>, accessed 11 January 2003).
- Australian Institute of Criminology (undated).** *Violence: directions for Australia, Part 1* (<http://www.aic.gov.au/research/cvp/ncv.html>, accessed 17 February 2003).
- Barnett WS (1993).** Economic evaluation of home visiting programs. *The Future of Children*, 3:93-112.
- Becker GS (1993).** Nobel lecture: the economic way of looking at behavior. *Journal of Political Economy*, 101:385-409.
- Biddle E, Hartley D (2002).** The cost of workplace homicides in the USA, 1990-1997. In *Injury Prevention and Control, 6th World Conference*, 421-422. Montreal, Les Presses de l'Universite de Montreal.
- Blau JR, Blau PM (1982).** The cost of inequality: metropolitan structure and violent crime. *American Sociological Review*, 47:114-129.
- Boardman A et al. (1996).** *Cost-benefit analysis: concepts and practice.* Upper Saddle River, NJ, Prentice Hall.
- Brand S, Price R (2000).** *The economic and social costs of crime. Home Office Research Study 217* (<http://www.homeoffice.gov.uk/rds/horspubsl.htm>, accessed 15 November 2002).
- Butchart A, Engstrom K (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.
- Buvinic M, Morrison AR, Shifter M (1999).** Violence in Latin America and the Caribbean: a framework for action. In Morrison AR, Orlando BE, eds. *Too close to home: domestic violence in the Americas* (3-34). New York, Inter-American Development Bank.
- Caldwell RA (1992).** *The costs of child abuse vs. child abuse prevention: Michigan's experience.* East Lansing, MI, Michigan Children's Trust Fund.
- Centers for Disease Control and Prevention (CDC) (2003).** *Costs of intimate partner violence against women in the United States.* Atlanta, GA, National Center for Injury Prevention and Control.
- Chanley S, Chanley JJ, Campbell HE (2001).** *Providing refuge: the value of domestic violence shelter services.* Arizona State University (<http://www.msu.edu/user/bob/cost.html>, accessed 11 February 2003).

- Chapdelaine A, Maurice P (1996).** Firearms injury prevention and gun control in Canada. *Canadian Medical Association Journal*, 155:1285-1289.
- Chappell D, Di Martino V.** Violence at work (2nd ed.). Geneva: International Labour Organization.
- 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* (<http://www.csneirc.org/>, accessed 22 January 2003)
- Clancy TV et al. (1994).** The financial impact of intentional violence on community hospitals. *The Journal of Trauma*, 37:1-4.
- Clark KA, Biddle AK, Martin SL (2002).** A cost-benefit analysis of the violence against women act of 1994. *Violence Against Women*, 8:417-428.
- Cohen MA (1988a).** Pain, suffering, and jury awards: a study of the cost of crime to victims. *Law and Society Review*, 22:537-555.
- Cohen MA (1998b).** The monetary value of saving a high-risk youth. *Journal of Quantitative Criminology*, 14:5-33.
- Cook PJ, Ludwig J (2002).** The costs of gun violence against children. *The Future of Children*, 12:87-99.
- Cook PJ et al. (1999).** The medical costs of gunshot injuries in the United States. *Journal of the American Medical Association*, 282:447-454.
- Courtney ME (1998).** The costs of child protection in the context of welfare reform. *The Future of Children*, 8:88-103.
- Courtney ME (1999).** The economics. *Child Abuse and Neglect*, 23:975-986.
- Daley M et al. (2000).** The costs of crime and the benefits of substance abuse treatment for pregnant women. *Journal of Substance Abuse Treatment*, 19:445-458.
- Day T (1995).** *The health related costs of violence against women: the tip of the iceberg*. London, Ontario, Centre for Research on Violence Against Women and Children Publication Series, The University of Western Ontario.
- Devine JA, Sheley JF, Smith MD (1988).** Macroeconomic and social control policy influences on crime rate changes, 1948-1985. *American Sociological Review*, 53:407-420.
- Dolan P (1997).** Modeling valuations for EuroQol health states. *Medical Care*, 35:1095-1108.
- Donato R, Shanahan M (1999).** *Economics of implementing intensive in-prison sex-offender treatment programs*. Australian Institute of Criminology, 1999 (<http://www.aic.gov.au/publications/tandi/ti134.pdf>, accessed 5 March 2003).
- Doyal L, Nandy S (1999).** *An integrated approach to injuries in the household: literature review and conceptual development paper*. Bristol, School of Policy Studies, University of Bristol (draft final report, NHS Regional Programme C/INJ/05/05.99/Doyal).
- Drummond M, McGuire A (2001).** *Economic evaluation in health care: merging theory with practice*. Oxford, Oxford University Press.
- Dubowitz H (1990).** Costs and effectiveness of interventions in child maltreatment. *Child Abuse and Neglect*, 14:177-186.
- El-Zanaty F et al. (1996).** *Egypt demographic and health survey*. Calverton, MD, Macro International.

- Engstrom K, Diderichsen F, Laflamme L (2002).** Socioeconomic differences in injury risks in childhood and adolescence: a nation-wide study of intentional and unintentional injuries in Sweden. *Injury Prevention* 8:137-142.
- Engstrom K, Diderichsen F, Laflamme L (2004).** Parental social determinants of risk for intentional injury: a cross-sectional study of Swedish adolescents. *American Journal of Public Health*, 94:640-645.
- Evasovich M et al. (1998).** The economic effect of child abuse in the burn unit. *Burns*, 24:642-645.
- Fajnzylber P, Lederman D, Loayza N (2000).** Crime and violence: an economic perspective. *Economia*, 1:219-302.
- Fanslow J et al. (1997).** The economic cost of homicide in New Zealand. *Social Science and Medicine*, 45:973-977.
- Fass SM, Pi C-R (2002).** Getting tough on juvenile crime: an analysis of costs and benefits. *Journal of Research in Crime and Delinquency*, 39:363-399.
- Fiala R, LaFree G (1988).** Cross-national determinants of child homicide. *American Sociological Review*, 53:432-445.
- Fisher A, Chestnut L, Violette D (1989).** The value of reducing risks to death: a note on new evidence. *Journal of Policy Analysis and Management*, 8:88-100.
- Forjuoh SN (2000).** Child maltreatment related injuries: incidence, hospital charges, and correlates of hospitalization. *Child Abuse and Neglect*, 24:1019-1025.
- Fromm S (2001)** *Total estimated cost of child abuse and neglect in the United States: statistical evidence*. Prevent Child Abuse America, 2001 (http://www.preventchildabuse.org/learn_more/research_docs/cost_analysis.pdf, accessed 5 March 2003).
- Gaviria A, Velez CE (2001).** *Who bears the burden of crime and violence in Colombia?* World Bank Discussion Paper. Washington, DC, World Bank.
- Glaeser EL (1999).** *An overview of crime and punishment*. Harvard University and the National Bureau of Economic Research, discussion paper. Boston, MA, Harvard University.
- Gold MR, Siegel JE, Weinstein MC (2001).** *Cost-effectiveness in health and medicine*. Oxford, Oxford University Press.
- Gonzales de Olarte E, Llosa PG (1999).** Does poverty cause domestic violence? Some answers from Lima. In: Morrison AR, Orlando BE, eds. *Too close to home: domestic violence in the Americas* (35-49). New York, Inter-American Development Bank.
- Gracheva V (1999)** Socioeconomic roots for cases of male violence against women in Russia. Council of Europe. (<http://www.eurowrc.org/13.institutions/3.coe/en-violence-coe/10.en-coe-oct99.htm/>, accessed 12 March 2003)
- Greenwood PW et al. (1994).** *Three strikes and you're out: estimated benefits and costs of California's new mandatory-sentencing law*. Santa Monica, CA, The Rand Corporation.
- Greenwood PW et al. (1996).** *Diverting children from a life of crime: measuring costs and benefits*. Santa Monica, CA, The Rand Corporation.

- Gun Control Alliance (2002).** The economic cost of gun violence. (<http://www.gca.org.za/facts/briefs/02economic.htm>, accessed 15 November 2002).
- Gunderson L (1999).** The financial costs of gun violence. *Annals of Internal Medicine*, 131:483-484.
- Hashemi L, Webster BS (1998).** Non-fatal workplace violence compensation claims (1993-1996). *Journal of Occupational and Environmental Medicine*, 40:561-567.
- Health Canada (2002).** *Violence against women. Impact of violence on women's health.* (<http://www.hc-sc.gc.ca/>, accessed 5 March 2003)
- Heise LL, Ellsberg M, Gottemoeller M (1999).** *Ending violence against women* (Population Reports, Series L, No. 11). Baltimore, MD, Johns Hopkins University School of Public Health, Center for Communications Programs.
- Henderson M. (2000).** *Impacts and costs of domestic violence on the Australian business/corporate sector.* Brisbane. Brisbane, Lord Mayor's Women's Advisory Committee, Brisbane City Council.
- Hoel H, Sparks K, Cooper C (2001).** *The cost of violence/stress at work and the benefits of a violence/stress-free working environment* (report commissioned by the International Labour Organization). Manchester, University of Manchester Institute of Science and Technology.
- Hornick JP, Paetsch JJ, Bertrand LD (2002).** *A manual on conducting economic analysis of crime prevention programs.* Ottawa, Canadian National Crime Prevention Centre.
- Illinois Coalition Against Sexual Assault (2002).** *Economic costs of sexual assault.* In: ICASA manual *By the Numbers* (<http://www.icasa.org/>, accessed 6 March 2003).
- Inter-American Development Bank (IADB) (2002).** *Violence as an obstacle to development.* IADB Technical Note 4. (<http://www.iadb.org/sds/SOC/>, accessed 15 November 2002).
- Irazuzta JE et al. (1997).** Outcome and cost of child abuse. *Child Abuse and Neglect*, 21:751-57.
- Jones AS (2000).** The cost of batterer programs. How much and who pays? *Journal of Interpersonal Violence*, 15:566-586.
- Kaplan GA et al. (1996).** Inequality in income and mortality in the United States: analysis of mortality and potential pathways. *British Medical Journal*, 312:999-1003.
- Karoly LA et al. (1998).** Investing in our children: what we know and don't know about the costs and benefits of early childhood interventions. The Rand Corporation. (<http://www.rand.org/publications/MR/MR898/>, accessed 22 January 2003).
- Kawachi I, Kennedy BP, Wilkinson RG (1999).** Crime, social disorganization and relative deprivation. *Social Science and Medicine*, 48:719-731.
- Kennedy BP et al. (1998).** Social capital, income inequality, and firearm violent crime. *Social Science and Medicine*, 47:7-17.
- Klein SR et al. (1999).** The socioeconomic impact of assault injuries on an urban trauma center. *The American Surgeon*, 57:793-797.

- Korf DJ et al. (1997).** *Economic costs of domestic violence against women*. Utrecht, Dutch Foundation of Women's Shelters.
- Krug E et al., eds. (2002).** *World Report on Violence and Health*. Geneva, World Health Organization.
- Laing L, Bobic N (2002).** *Economic costs of domestic violence. Literature Review*. Sydney, Australian Domestic and Family Violence Clearinghouse.
- Lester D, Motohashi Y, Yang B (1992).** The impact of the economy on suicide and homicide rates in Japan and the United States. *International Journal of Social Psychiatry*, 38:314-317
- Lloyd S, Taluc N (1999).** The effects of male violence on female employment. *Violence Against Women*, 5:370-392.
- Ludwig J, Cook PJ (1999).** The benefits of reducing gun violence: evidence from contingent valuation survey data. National Bureau of Economic Research, working paper 7166. (<http://www.nber.org/papers/w7166>, accessed 6 March 2003).
- Ludwig J, Cook PJ (2000).** Homicide and suicide rates associated with implementation of the Brady Handgun Violence Prevention Act. *Journal of the American Medical Association*, 284:585-591.
- Mansingh A, Ramphal P (1993).** The nature of interpersonal violence in Jamaica. *West Indian Medical Journal*, 42:53-56.
- Markowitz S (2000).** An economic analysis of alcohol, drugs, and violent crime in the national crime victimization survey. National Bureau of Economic Research, working paper 7982. (<http://nber.org.papers/w7982>, accessed 6 March 2003).
- Markowitz S, Grossman M. (1998).** Alcohol regulation and violence towards children. National Bureau of Economic Research, working paper 6359 (<http://nber.org.papers/w6359>, accessed 6 March 2003).
- Max W, Rice DP (1993).** Shooting in the dark: estimating the costs of firearm injuries. *Health Affairs*, 12:171-185.
- Mendonca RN, Alves JG, Cabral Filho JE (2002).** Hospital costs due to violence against children and adolescents in Pernambuco State, Brazil during 1999. *Cad Saude Publica*, 18:1577-1581.
- Messner SF (1989).** Economic discrimination and societal homicide rates: further evidence on the cost of inequality. *American Sociological Review*, 54:597-611.
- Miller TR (1989).** *Narrowing the plausible range around the value of life*. Washington, DC, The Urban Institute.
- Miller TR (1995).** Costs associated with gunshot wounds in Canada in 1991. *Canadian Medical Association Journal*, 153:1261-1268.
- Miller TR, Fisher DA, Cohen MA (2001).** Costs of juvenile violence: policy implications. *Pediatrics*, 107:1-7.
- Miller TR, Cohen MA (1997).** Costs of gunshot and cut/stab wounds in the United States, with some Canadian comparisons. *Accident Analysis and Prevention*, 29:329-341.
- Miller TR, Levy DT (2000).** Cost-outcome analysis in injury prevention and control: eighty-four recent estimates for the United States. *Medical Care*, 38:562-582.

- Miller TR, Cohen MA, Rossman SB (1993).** Victim costs of violent crime and resulting injuries. *Health Affairs*, 12:186-197.
- Miller, TR, Cohen MA, Wiersema B (1996).** *Victim costs and consequences: a new look*. National Institute of Justice Research Report. Landover, Maryland, National Institute of Justice, US Department of Justice, Office of Justice Programs.
- Mock C, Pilcher S, Maier R (1994).** Comparison of the costs of acute treatment for gunshot and stab wounds: further evidence of the need for firearm control. *The Journal of Trauma*, 36:516-522.
- Morrison AR, Orlando MB (1999).** Social and economic costs of domestic violence: Chile and Nicaragua. In Morrison AR, Orlando BE, eds. *Too close to home: domestic violence in the Americas* (51-80). New York, Inter-American Development Bank.
- National Crime Prevention Council (1999).** *Saving money while stopping crime*. (<http://www.ncpc.org/catalyst/9912b.htm/>, accessed 21 March 2003).
- Nelson CL, Puskarich CL, Marks A (1987).** Incidence, cost, and concepts of prevention. *Clinical Orthopedics*, 222:114-121.
- New M, Berliner L (2000).** Mental health service utilization by victims of crime. *Journal of Traumatic Stress*, 13:693-707.
- Olds DL et al. (1986).** Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics*, 78:65-78.
- Olds DL, Kitzman H (1993).** Review of research on home visiting for pregnant women and parents of young children. *The Future of Children*, 3(3):53-92.
- Olds DL et al. (1999).** Prenatal and infancy home visitation by nurses: recent findings. *Future of Children*, 9(1):44-45.
- Paoli P (2000).** *Violence at work in the European Union: recent findings*. Dublin, European Foundation for the Improvement of Living and Working Conditions.
- Payne JE et al. (1993).** Outcome of treatment of 686 gunshot wounds of the trunk at Los Angeles County-USC Medical Center. *The Journal of Trauma*, 34:276-281.
- Peden M, Van der Spuy J (1998).** The cost of treating firearm victims. *Trauma Review*, 6:4-5.
- Pernanen K (undated).** *The social cost of alcohol-related crimes: conceptual, theoretical, and causal attributions*. Norway, National Institute for Alcohol and Drug Studies (<http://www.ccsa.ca/costs/pernanen.htm>, accessed on 23 May 2003).
- Pfizer (2001).** Responding to the global public health challenge of violence. *The Pfizer Journal*, Global Edition, 11:1.
- Phillips R (1998).** The economic cost of homicide to a South African city [thesis]. Cape Town, University of Cape Town Graduate School of Business.
- Physicians for Social Responsibility (2002).** *The economic costs of gun violence*. (<http://www.psr.org/>, accessed 6 March 2003).
- Plotnick RD, Deppman L (1999).** Using benefit-cost analysis to assess child abuse prevention and intervention programs. *Child Welfare*, 78:381-407.
- Post LA et al. (2002).** The rape tax: tangible and intangible costs of sexual violence. *Journal of Interpersonal Violence*, 17:773-782.

- Rudmond WJ, Davey D (2000).** Identifying domestic violence with inpatient hospital admissions using medical records. *Women and Health*, 30:1-13.
- Shihadeh ES and Ousey GC (1998).** Industrial restructuring and violence: the link between entry level jobs, economic deprivation, and black and white homicide. *Social Forces*, 77:185-207.
- Song DH et al. (1996).** Gang warfare: the medical repercussions. *The Journal of Trauma*, 40:810-815.
- Snively S (1994).** *The New Zealand economic cost of family violence*. Auckland, Department of Social Welfare.
- Stanko E et al. (1998).** *Counting the costs: estimating the impact of domestic violence in the London borough of Hackney*. London, Hackney Safer Cities and the Children's Society.
- Summers CL, Molyneux EM (1992).** Suspected child abuse: cost in medical time and finance. *Archives of Disease in Childhood*, 67:905-910.
- Sumner BB, Mintz ER, Brown PL (1987).** Injuries caused by personal violence. *Injury*, 18:258-260.
- Szwarcwald CL et al. (1999).** Income inequality and homicide rates in Rio de Janeiro. *American Journal of Public Health*, 89:845-850.
- Tellez MG et al. (1995).** Risks, costs, and the expected complications of re-injury. *The American Journal of Surgery*, 170:660-663; discussion 664.
- Tjaden P, Thoennes N (2000).** *Full report of the prevalence, incidence, and consequences of violence against women: findings from the National Violence Against Women Survey*. Washington, DC, National Institute of Justice, Office of Justice Programs.
- Ulrich YC et al. (2003).** Medical care utilization patterns in women with diagnosed domestic violence. *American Journal of Preventative Medicine*, 24:9-15.
- United States Department of Health and Human Services (2001).** *Prevention pays: the costs of not preventing child abuse and neglect*. Fairfax, VA, Caliber Associates (<http://www.calib.com/nccanch/pubs/prevenres/pays.cfm>, accessed 21 March 2003).
- United States Department of Justice (1994).** *The costs of crime to victims: crime data brief*. Bureau of Justice Statistics (<http://www.ojp.usdoj.gov/bjs/pub/>, accessed 6 March 2003).
- Unnithan NP, Whitt HP (1992).** Inequality, economic development and lethal violence: a cross-national analysis of suicide and homicide. *International Journal of Comparative Sociology*, 33:182-260.
- Vassar MJ, Kizer KW (1996).** Hospitalizations for fire-arm related injuries: a population-based study of 9562 patients. *Journal of the American Medical Association*, 275(22):1734-1739.
- Viscusi WK (1993).** The value of risks to life and health. *Journal of Economic Literature*, 31:1912-1946.
- Waller JA, Skelly JM, Davis JH (1994).** Characteristics, costs, and effects of violence in Vermont. *The Journal of Trauma*, 37:921-927.
- Walker E et al. (1999).** Costs of health care use by women HMO members with a history of childhood abuse and neglect. *Archives of General Psychiatry*, 56:609-613.

- Walker J (1997).** *Estimates of the costs of crime in Australia 1996: trends & issues in crime and criminal justice.* Trends and issues in crime and criminal justice, Number 72. August. Canberra, Australia, Australian Institute of Criminology.
- Wilt SA, Gabrel CS (1998).** A weapon-related injury surveillance system in New York City. *American Journal of Preventive Medicine*, 15(3S):75-82.
- Wisner C et al. (1999).** Intimate partner violence against women: do victims cost health plans more? *The Journal of Family Practice*, 48:439-443.
- Womankind Worldwide (2002).** *The costs of violence against women: global facts and figures.* (<http://www.womankind.org.uk/>, accessed 5 December 2002).
- Women's Advocates Inc. (2002).** Domestic violence fact sheet. (<http://www.wadvocates.org/factsheet.htm>, accessed 5 December 2002).
- World Bank (2003).** *List of world economies.* Washington, DC, World Bank.
- Yodanis C, Godenzi A (1999).** *Male violence: the economic costs - a methodological review.* Council of Europe (<http://www.eurowrc.org/13.institutions/3.coe/en-violence-coe-oct99.htm>, accessed 5 December 2002).
- Yodanis C, Godenzi A, Stanko E (2000).** The benefits of studying costs: a review and agenda for studies on the economic costs of violence against women. *Policy Studies*, 21:263-276.



World Health Organization
Avenue Appia 20
1211 Geneva 27
Switzerland
Tel +41-22-791-2533
Fax +41-22-791-4332
www.who.int/violence_injury_prevention
violenceprevention@who.int

ISBN 92 4 159160 9

