DataWatch

Victim Costs Of Violent Crime And Resulting Injuries

by Ted R. Miller, Mark A. Cohen, and Shelli B. Rossman

Abstract: This DataWatch estimates the costs and monetary value of lost quality of life due to death and nonfatal physical and psychological injury resulting from violent crime. In 1987 physical injury to people age twelve and older resulting from rape, robbery, assault, murder, and arson caused about $10 billion in potential health-related costs, including some unmet mental health care needs. It led to $23 billion in lost productivity and almost $145 billion in reduced quality of life (in 1989 dollars). If associated deaths and cases resulting in psychological injury only are included, costs average $47,000 for rape, $19,000 for robbery, $15,000 for assault, and $25,000 for arson. Considering only survivors with physical injury, rapes cost $60,000, robberies $25,000, assaults $22,000, and arson $50,000. Costs are almost $2.4 million per murder. Lifetime costs for all intentional injuries totaled $178 billion during 1987-1990.

In a discussion of violence and its impact on society, one aspect to consider is the cost of violent crime to victims. It is useful to quantify costs in this way for several reasons. They are important both in characterizing the crime problem and in examining ways to address it. They allow analysts and advocates to combine statistics on disparate crimes into a single, readily understood metric. They guide resource allocation.[1] They provide insight into such crucial policy issues as the likely costs of mental health care for crime victims if mental health care were to be universally reimbursed. They allow program planners and evaluators to estimate the cost savings from a community policing program. And they yield insight into the rationality of early prisoner release programs.

This DataWatch provides estimates of the cost of violent crime to the victims, based on data from several national data sets.

Data Sources, Methods, And Limitations

Incidence. The National Crime Survey (NCS) is the most comprehensive source of information available on the frequency and outcomes of

Ted Miller directs the Safety and Health Policy Program at the National Public Services Research Institute in Landover, Maryland. Mark Cohen is an associate professor in the Owen Graduate School of Management, Vanderbilt University, Nashville, Tennessee. Shelli Rossman is a senior research associate at The Urban Institute in Washington, D.C.

nonfatal rape, robbery, and assault. In face-to-face interviews, victims report nonfatal victimization, physical injury, work losses, and selected costs. Familial violence (child abuse, elder abuse, and spousal assault) and rape probably are underreported in the NCS.[2] The NCS excludes victimization of children under age twelve, military personnel, the institutionalized, and the homeless. For this study we used average NCS incidence counts for 1987-1990, during which period overall crime incidence was essentially stable. Homicides, for example, numbered between 20,000 and 22,000 each year.[3] We computed unit costs of crime injury using the 1987 NCS.

The quality of the injury costs from the NCS victim self-reports is suspect for several reasons. The survey asks victims to recall details of crimes that occurred up to six months earlier. Victims who suffered minor injuries at the start of this time period may forget small costs, while those who suffered serious injury may be unaware of the cumulative costs. For example, hospital bills may go directly to the insurer, so that the insured never learns of the amount. Also, the NCS includes only costs through the interview date, on average only three months after victimization.

Our source for nonfatal and fatal injuries in arson fires was 1987 estimates from the National Fire Incident Reporting System (NFIRS), which compiles fire department reports. Both civilian and firefighter injuries are included. NFIRS relies on voluntary reporting, with about half of all fire departments participating. The U.S. Fire Administration applies an algorithm to generate national NFIRS estimates. Given the nonrandom sample, these weighted estimates clearly are imperfect.

Our third source was the Federal Bureau of Investigation's (FBI's) Uniform Crime Reports (UCR), which counts other fatal injuries and largely allocates them among rape, robbery, and assault. Circumstances underlying murders were known in two-thirds of the cases. We distributed the remainder proportionally to cases with known circumstances.

Cost framework. The cost estimates presented here represent an initial effort to estimate recent costs of victimization, using mostly secondary data. The findings represent a preliminary, rather than a definitive, study. The cost framework and methods build from earlier studies.[4] Like those studies, this DataWatch describes three categories of costs: (1) direct losses other than property losses-including costs of medical, mental health, and emergency response services, as well as insurance administration; (2) productivity losses-wages, fringe benefits, and housework; and (3) nonmonetary losses-pain, suffering, and lost quality of life. We excluded property losses and the costs society incurs to prevent future crime.

This DataWatch presents two sets of cost estimates. One set shows the cost per physically injured crime victim, with murder treated as a separate category. The second shows costs per victimization associated with com-

pleted or attempted crime. This latter version incorporates many crimes that resulted in psychological injury only. It also allocates murders to their underlying cause: A rape-murder victim is considered a rape victim, someone murdered during a robbery is a robbery victim, and someone murdered during a quarrel is an assault victim. Thus, this version shows the relative seriousness of different crimes (which is useful, for example, when debating appropriate penalties).

Medical costs. Average medical costs per fatal injury came from Dorothy Rice and colleagues; no differentiation by cause was possible.[5] The NCS captures only short-term medical costs for rape, robbery, and assault. Thus, to estimate long-term medical costs, we used the only national data available on the temporal distribution of injury medical costs: the Detailed Claims Information (DCI) database of the National Council on Compensation Insurance (NCCI). This database longitudinally tracks the medical care costs of 450,000 randomly sampled victims of disabling workplace injuries suffered between 1979 and 1987.[6] Our computations assumed that the unknown NCS injury distribution within each NCS injury category was similar to the DCI injury distribution within each category.

The DCI excludes rape. To estimate long-term costs for rape, we applied the percentage of medical costs beyond six months for the DCI category with the highest percentage of costs within six months (92 percent). Rape, however, may have potentially costly long-term consequences. For example, the NCS does not ask explicitly about pregnancy, abortion, venereal diseases, or human immunodeficiency virus/acquired immunodeficiency disease syndrome (HIV/AIDS). Carole Jenny and colleagues reported that 43 percent of a sample of 204 victims examined within seventy-two hours after rape incidents showed evidence of sexually transmitted diseases.[7] Among victims who showed no evidence of such diseases at the initial examination and who were not treated to prevent them, the incidence of new diseases ranged from 2 percent for chlamydia to 19 percent for bacterial vaginosis.

The distribution of injuries in arson fires came from unpublished NFIRS data. We used DCI unit costs of burns and smoke inhalation; for other injuries we assumed that average medical costs per arson-related injury are the same as for comparable injuries (for example, a broken bone) to assault and robbery victims.

Some incidents of victimization may aggravate preexisting conditions that later cause significant health problems. For example, elderly victims may be at increased risk of future heart attacks.[8] Our estimates capture these costs incompletely.

Mental health costs. Despite a growing awareness of post-traumatic stress disorder and the psychological impact of intentional injury on its

victims, estimates of mental health-related expenses for victims are not readily available.[9] In fact, the NCS does not query respondents about mental health treatment. Exhibit 1 estimates crime victims' mental health injury rates. For example, an estimated 10 percent of rape victims suffer from severely disabling psychological injury, and 40 percent suffer from emotional distress severe enough to require mental health treatment beyond initial counseling.

To derive these frequencies, we started with the literature-based estimates by Mark Cohen.[10] More recent literature confirmed the order of magnitude of Cohen's rape estimates but provided better estimates for other crimes. Specifically, Dean Kilpatrick's survey of 391 Charleston, South Carolina, women estimated that psychological injury resulted from 57 percent of completed rapes, 37 percent of aggravated assaults, and 18 percent of completed robberies.[11] The psychological injury rate for completed rape was 3.3 times the rate for attempted rape. We assumed that this ratio applied to other crimes and that rates for men and women were comparable. Weighting the Kilpatrick psychological injury rates for completed versus attempted crimes by NCS crime completion rates yields overall psychological injury rates. Following Cohen, we assumed that the ratio of severe disorder to distress was one to four for rape. For other crimes, we assumed a ratio of one to eight. Those ratios allowed us to compute injury rates by severity from the total. These estimates exclude the cost of treating post-traumatic stress disorder in family members, police, and other service providers.

No data describe typical mental health care use by crime victims. Following Cohen, we assumed that potential mental health costs per injury for the psychological injuries in Exhibit 1 equal average mental health care costs incurred by people who won jury verdicts for emotional distress ($4,160) and severely disabling psychological injury ($24,800). These costs are potential costs because they describe a population whose psychological injuries were treated, An unknown portion of psychological injury victims go

Exhibit 1
Percentage Of Crime Victims With Mental Health Care Needs

	Emotional distress	Severely disabling mental illness
Rape	40.0%	10.0%
Robbery	12.3	1.5
Assault	5.4	0.7
Arson	2.0	-

Source: Vanderbilt/Urban Institute Cost of Crime Study, 1993.
Notes: Includes attempted and completed crimes. Needs count only cases severe enough to require treatment beyond initial counseling.

untreated. Thus, potential mental health costs overestimate current costs.

Victim services. Victim service organizations provide a range of services, including counseling, shelter, and financial assistance. The United States has more than 2,000 victim service programs. The U.S. Department of Justice Office of Victims of Crime supports 1,422 of these. These agencies receive more than $35 million in funding as a result of the Victims of Crime Act (VOCA). The ratio of VOCA to nonfederal funding is at least three to one. Since VOCA funds no more than 70 percent of all victim service agencies, the total expenditures on victim services probably exceeded $200 million in 1987. The bulk of these expenditures are used for programs designed to deal with rape, domestic violence, and child abuse. Since we lack a breakdown by victim type, these costs were excluded from the analysis.

Emergency response costs. Emergency response costs are derived from reported crimes. We surveyed eight police departments about primary response and follow-up investigative times. Automated police data show time spent by type of crime but not whether the victim was physically injured. We used averages by crime. Unit costs of police response were calculated as salary plus fringe benefits and administrative overhead multiplied by the average time spent on a case per category of crime.[12] Although some police time is overtime, we valued all time as regular time.

The NCS lacks data on emergency transport. We used the 1980 National Medical Care Utilization and Expenditure Survey (NMCUES) estimate of average emergency transport costs for hospitalized nonfatal injuries of $144 per one-way transport. We arbitrarily assumed that all persons who were admitted as hospital inpatients had been transported by ambulance and that persons who were not inpatients had not received such emergency transport. Emergency transport and coroner costs for highway crash fatalities were assumed to be comparable to homicide costs.[13]

Productivity losses. Productivity costs per homicide average $610,000. This average is the productivity loss per firearm-related fatality inflated to 1987 dollars and adjusted to a 2.5 percent discount rate (in the range used by courts in compensating liability).[14] It is based on the victim's age and sex only. It was not adjusted for victims' income levels or other demographic characteristics. Adjusting probably would lower the value.

For victims of nonfatal injury, the NCS data described workdays lost during the first few months after injury. Lost wages per day were assumed to equal average daily earnings in private nonagricultural industries. Lost housework days were estimated at 1.5 times the number of lost workdays for those who reported employment. We assumed that victims who were not students or workers lost the same number of housework days as workers lost. John Douglass and colleagues have provided average annual values of

housekeeping services: $5,169 for the employed and $9,131 for the nonemployed.[15]

We assumed that all victims under age nineteen were students but that no older victims were. The value of lost schooldays was calculated as the average workdays per worker, reduced by 25 percent due to the seasonality of the school year. Each lost schoolday was valued at $23.96, the average annual cost per pupil in average daily attendance divided by an assumed average school year of 166 days.[16] Arson-related productivity losses were estimated in the same manner as medical costs.

To compute long-term productivity loss, we first computed the primary International Classification of Diseases (ICD) distribution for hospitalized victims of rape, robbery, and assault, using California, Washington, and Vermont hospital discharge tapes with mandatory cause coding. Similarly, we computed the ICD distribution of nonhospitalized crime injuries from a convenience sample of twenty-one emergency rooms (in nine communities) that were able to supply this information. For physical injuries associated with rape, robbery, and assault, we multiplied the number of cases by ICD code and hospitalization status times the corresponding DCI probabilities of permanent total and partial disability to get probabilities by type of crime and hospitalization status.[17] We combined the hospitalized and nonhospitalized probabilities using NCS hospitalization rates. For arson, we applied the disability probabilities to the NFIRS arson injury distribution. To translate the permanent disabilities into productivity losses, we multiplied them times $610,000 (average productivity costs per homicide) for permanent disabilities and 17 percent of this amount for partial disabilities.[18] The long-term productivity losses average $1,261 for rape, $741 for robbery, $476 for assault, and $1,411 for arson.

Program administration. The administrative costs of health and disability insurance were estimated by multiplying the appropriate costs times the percentage reimbursed by each type of payer times type-specific insurance loss-adjustment expense ratios.[19] For example, life insurance administrative cost was estimated as a 9 percent administrative cost on average life insurance coverage of $47,000 per U.S. adult.[20] This cost factor was applied to adult victims only.

Lost quality of life. Nonmonetary costs of intentional injury include pain, suffering, fear, and lost quality of life. These costs were estimated using two techniques: jury compensation and willingness to pay.

Following Cohen, we estimated the jury compensation for pain, suffering, and lost quality of life received by victims of physical injuries similar to those reported in the NCS. We started from jury award data from Jury Verdict Research, which lists compensatory damage awards and medical care and productivity losses. We estimated regression equations predicting

pain and suffering as a function of the medical care and productivity costs and category of injuries, then substituted in average NCS costs by crime. Pain and suffering due to psychological injury were estimated as a function of mental health care costs from average awards for emotional distress and severe psychological trauma in cases without physical injury. For victims without physical or psychological injury, a fear component was estimated. This component is based upon a few jury awards in Louisiana, where the courts allow recovery for fear without injury. Estimating these costs using jury verdict data implicitly assumes that victims receive required mental health care. Victims not receiving needed treatment would experience higher psychological injury costs.

Willingness-to-pay estimates—value-of-life estimates derived from the amount people willingly pay for safety when, for example, buying a smoke detector or an automobile with airbags-were made using values of fatal risk reduction from a literature review and synthesis by Ted Miller.[21] For nonfatal injuries, quality-adjusted life years (QALYs) lost were estimated using previously developed methods, then multiplied times a value per life year derived from the value per life lost. To derive the quality-adjusted life years, we started with physician ratings of typical functional capacity loss by injury on six dimensions: cognitive, mobility, sensory, cosmetic, pain, and activities of daily living (essentially, bending, lifting, and grasping). We added a work-related disability dimension, based on the DCI disability probabilities. The capacity losses were combined into a single quality adjusted life year **loss** per **injury** using survey data on the relative value loss associated with each dimension and level of functional loss.[22]

Willingness-to-pay amounts generally equaled an estimated 70 to 80 percent of jury compensation amounts. Quality-adjusted life year ratings were not available for rape, knife wounds, gunshot wounds, and psychological injuries. Based on the ratio for other injuries, we assumed that willingness to pay is 75 percent of jury compensation for these injuries. The exhibits show pain, suffering, and lost quality of life due to physical injury computed as willingness to pay minus the productivity losses.

These losses largely come from typical injury settings, not crime settings. Therefore, quality-of-life losses due to psychological injury were computed from the mental health care costs (as described above) and added. The costs of fear were applied only to cases without physical or psychological injury.

Results

Incidence. Nearly 6.3 million persons per year were victimized by rape, robbery, assault, and arson in 1987-1990. Exhibit 2 estimates nonfatal and fatal crime victims as well as injury counts and hospitalization probabilities

Exhibit 2
Annual Crime Victimizations, 1987-1990, And Number Of People Victimized, Killed, Nonfatally Injured, And Hospitalized In 1987

	Rape	Robbery	Assault	Arson	Total
Victimizations	229,000	1,482,000	9,126,000	105,000	10,942,000
Victims	148,000	1,071,000	4,947,000	105,000	6,271,000
Deaths	305	2,497	16,654	753	20,209
Percent of victimizations	0.13%	0.17%	0.18%	0.72%	0.18%
Nonfatal injury victims	90,000	383,000	1,412,000	15,000	1,900,000
Percent of victims	61%	36%	29%	14%	30%
Hospitalized nonfatal injury victims	6,000	30,000	60,000	-	96,000
Percent of victims	4%	3%	1%	-	2%
Percent of nonfatal iniured	7%	8%	4%	-	5%

Sources: National Crime Survey; Uniform Crime Reports; and National Fire Incident Reporting System.
Notes: Data are largely for persons age twelve and older; death and arson counts arc for all ages. Counts include attempted rape, robbery, and assault. Victimizations outnumber victims because the former includes repeat occurrences of crimes.

for crime victims age twelve and older. This exhibit omits secondary victims-family members and others whose quality of life is adversely affected by the crime. The victimization count includes repeat victimizations; the victim and injury counts refer only to single victimizations and the most recent incident for serial victimizations.

Exhibit 2 describes the number of victimizations, the number of victims, and the percentage of victimizations that were fatal. It also shows the percentage of survivors who sustained injuries and the percentage of the injured who were hospitalized. Nearly one-third of crime survivors reported some physical injury. Sixty-one percent of rape and attempted rape survivors reported physical injuries. Injuries were reported by 36 percent of robbery or attempted robbery survivors and 29 percent of assault or attempted assault survivors. Approximately 3 percent of arson fires resulted in civilian injury and 11 percent in firefighter injury. Of those reporting injury due to rape, robbery, and assault, 5 percent were hospitalized.

More than 4 percent of injured victims sustained gunshot or stab wounds, and almost 7 percent had bones broken or teeth knocked out. The vast majority (81 percent) of victims who reported injury, however, suffered nothing more serious than bruises, cuts, and scratches.

Criminal victimization accounts for 3.3 percent of all injuries.[23] Intent to harm makes these injuries atypically severe. They include 14 percent of injury deaths and 4 percent of hospital admissions.

Injury costs. Exhibit 3 shows unit costs (including the monetary value of pain, suffering, and lost quality of life) of crimes resulting in injury. Costs approach $2.4 million per murder in 1989 dollars. For survivors with

Exhibit 3
Summary Of Victim Injury Costs Per Physical Injury, In 1989 Dollars

Cost category	Rape plus other injury	Robbery	Assault	Arson	Murder
Total monetaq	$ 6,228	$ 3,075	$2,991	$12,885	$ 671,136
Medical	1,367	430	678	1,490	6,467
Emergency services	66	34	25	147	520
Productivity	4,683	2,562	2,084	11,612	656,192
Administrative	112	49	204	108	7,957
Total mental health	36,306	10,387	5,802	1,224	–
Mental health medical	4,990	1,072	490	100	–
Mental health productivity	1,465	333	202	48	–
Quality of life losr to psychological injury	29.85 1	8,982	5,110	1,076	–
Quality of life	17,842	11,485	13,521	35,022	1,715,918
Total cost	60,376	24,947	22,314	49,603	2,387,054

Source: Vanderbilt/Urban Institute Cost of Crime Study, 1993.
Note: Excludes property damage, legal costs, and employer costs; includes attempted rapes and robberies that resulted in physical injury.

physical injury, rapes cost $60,000, robberies $25,000, assaults $22,000, and arson almost $50,000. Lost quality of life generally is about three-fourths of the total cost.

Excluding psychological costs, the cost per crime-related physical injury victim (across fatal and nonfatal injuries) averaged $31,300. By comparison, the average noncrime injury (attempted suicide or unintentional injury) cost $23,400.[24] The difference is that intentional injuries are more often fatal than unintentional injuries, on average. Nonfatal injury costs averaged $16,600 for crime injuries and $18,300 for other injuries.

Exhibit 4 shows unit costs for all crimes. The costs include attempted crimes (rape, robbery, and assault attempts that resulted in sufficient physical or psychological injury to cause the victim to view them as criminal victimization even though they were not completed) and crimes without physical injury. They also allocate murder costs to the crimes, primarily assaults, that underlie the murders. From this perspective, rapes have the highest average cost at $47,000, followed by arson at $25,000, robbery at $19,000, and assault at $15,000. Not surprisingly, psychological trauma costs dominate the rape costs. Aside from differences in psychological trauma costs, a rape costs only slightly more than a robbery or an assault.

Exhibit 5 gives lifetime costs of injury to persons age twelve and older due to rape, robbery, assault, arson, and murder, computed from average annual incidence during 1987-1990. Lifetime costs for these injuries total $178 billion. Of this amount, $10 billion is for rape, $23 billion for robbery, $96 billion for assault, close to $1 billion for arson, and $48 billion for

Exhibit 4
Summary Of Victim Injury Costs Per Crime, In 1989 Dollars

Cost category	Rape	Robbery	Assault	Arson
Total monetary	$ 3,010	$2,245	$ 2,093	$6,737
Medical	466	165	206	261
Emergency services	52	27	18	26
Productivity	2,444	2,022	1,796	6,377
Administrative	48	31	73	73
Total mental health	36,267	10,372	5,792	1,216
Mental health medical	4,990	1,072	490	loo
Mental health productivity	1,465	333	202	48
Quality of life lost to psychological injury	29,812	8,967	5,100	1,068
Quality of life	8,147	6,869	6,853	16,761
Quality of life-nonfatal	5,970	4,115	3,873	5,043
Quality of life-fatal	2,177	2,754	2,980	11,718
Total cost	47,424	19,486	14,738	24,714

Source: Vanderbilt/Urban institute Cost of Crime Study, 1993.
Note: Excludes property damage, Legal costs, and employer costs; includes attempted rapes and robberies that resulted in physical injury.

murder. These estimates exclude property losses. If rape is the most under-reported crime in the NCS, its actual share of the total is underestimated here. Unless the distribution-&f injuries varies between reported and unreported rapes, however, the costs per case would not be affected.

Exhibit 5
Lifetime Costs Of Criminal Victimizations, Based On Average Annual Incidence From 1987 To 1990, Millions Of 1989 Dollars

Cost category	Rape	Robbery	Assault	Arson	Murder	Total
Total monetary	$ 483	$1,652	$ 7,894	$200	$13,564	$ 23,793
Medical	104	228	1,769	22	131	2,254
Emergency services	12	39	155	2	11	219
Productivity	358	1,359	5,438	174	13,261	20,590
Administrative	9	26	532	2	161	730
Total mental health	8,294	15,349	52,853	127	0	76,623
Mental health medical	1,140	1,586	4,464	10	0	7,200
Mental health productivity	335	493	1,840	5	0	2,673
Quality of life lost to psychological injury	6,819	13,270	46,549	112	0	66,750
Quality of life	1,364	6,090	35,279	526	34,677	77,936
Total cost	10,141	23.091	96.026	853	48,241	178,352

Source: Vanderbilt/Urban Institute Cost of Crime Study, 1993.
Notes: Rape and assault categories include attempts. Costs exclude property damage, legal costs, and costs to employers.

Including administrative costs, lifetime medical costs of intentional injury for persons age twelve and older due to rape, robbery, assault, and arson total $2.9 billion. Violent crime accounts for about 5 percent of injury treatment costs.25 Including related spending for treatment, administrative costs, emergency transport, and mental health treatment brings potential health-related spending due to violent crime against those ages twelve and over to about $10 billion. Associated productivity losses exceed $23 billion.

At $7.2 billion, the potential mental health care and related administrative costs of rape, robbery, assault, and arson dwarf the medical costs. One reason is that many victims suffer only psychological injury. However, even among those with physical injuries, psychological costs dominate the picture. Current spending needs to be measured against this potential cost. A key question is how much spending would grow if mental health care were reimbursed more extensively, as it would be under President Clinton's health care reform proposal. Despite the dominance of mental health costs in crime-related injuries, typically only physical injury costs are included in estimates of violence and injury costs. Policymakers should take note of this disparity as different health care reform plans are debated.

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NOTES

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