# Recommendations

Injury in the United States has an enormous impact on society. The lifetime direct and indirect costs of injuries occurring in the United States in a single year amount to $158 billion and over 10 million lost life years. The consequences of disabling injury are economically and personally devastating for individuals, families, and the community.

The case studies presented in this report vividly describe how the lives of injured persons and their families are significantly and permanently changed. The high cost associated with injury, including the first and later year costs, demonstrate that the long-term economic effect of severe injury is a significant burden on society. All sectors of the nation's economy share the burden, including federal, state, and local governments and the private sector. Injury is a major public health problem that needs to be addressed by a variety of strategies. Prevention, control, treatment, and rehabilitation planning are required to reduce the number of deaths and nonfatal injuries as well as the associated high costs. Both new injury research and the application of existing knowledge deserve high national priority.

The estimated lifetime cost of injury in the United States reported herein is the best estimate based on existing data. The conduct of the present study involved use of information from numerous sources, but in many cases estimates were necessarily made on the basis of limited data. The recommendations presented herein address the following injury issues:

- Injury prevention and control,
- Coding and measurement,
- Data needs, and
- Treatment and rehabilitation.

## Injury Prevention and Control

The science of injury control has improved markedly in the past twenty-five years. The effectiveness of passive protection, environmental modification, and performance standards for consumer products has been documented in specific circumstances of injury. However, the enormous burden of injury demands that additional resources be devoted to injury prevention research and control evaluation.

## Resources Needed for Injury Prevention Research

In *Injury in America,* the Committee on Trauma Research report published by the National Academy of Sciences (Committee, 1985) identifies significant research needs in the areas of injury epidemiology, prevention, biomechanics, and treatment and concludes that in light of the magnitude of the injury problem, increased efforts are warranted. One of the major recommendations of that report is for the establishment of a Center for Injury Control at the U.S. Centers for Disease Control (CDC) to support research and prevention in the identified problem areas. The results of the research reported herein shed further light on the magnitude of injury cost, the impact on individuals and families, and the burden on public resources, which continue to dwarf efforts to diminish these impacts. A new focus on the problem of injury in the United States is needed at this time. Increased investment in the prevention of injury will pay substantial dividends.

***RECOMMENDATION: Direct greater resources to the prevention of injuries and the mitigation of their results through the application of existing knowledge and the development and evaluation of new strategies. Establish and fund a Center for Injury Control within CDC to provide a focal point for national injury prevention activities. Provide additional resources to existing agencies that currently pursue the prevention and control of injury resulting from motor vehicles, fires, consumer products, and occupational hazards.***

## Evaluation of Injury Control Interventions

Numerous interventions for injury control have never been evaluated or have been studied on a scale too small to produce reliable results. For most interventions, there are insufficient data to estimate cost effectiveness. Evaluation is necessary to identify and replicate successful interventions, and to avoid adverse effects. Well-designed studies of the costs and benefits of alternative injury control interventions are needed.

***RECOMMENDATION: Conduct research and controlled experiments to evaluate the effectiveness and savings of a wide range of injury control interventions and implement programs shown to be cost effective.***

Many injury prevention measures have been shown to be effective in reducing the frequency and severity of injury but have not been systematically applied. These interventions relate to changes in the

physical environment and in behavior. The barriers to the implementation of these interventions need to be investigated. Injury prevention research should evaluate why measures that have been proven to be effective are not implemented or are discontinued.

***RECOMMENDATION: Conduct research to evaluate the societal barriers to the application of injury prevention strategies that have been proven to be effective.***

## Coding and Measurement Issues

A major limitation of existing data sources for injury surveillance and epidemiologic research is the lack of uniform information on the cause, type, and severity of injuries. Discharge data on hospitalizations involving injury routinely include codes for the diagnosis of the specific nature or type of injury (e.g., fracture or sprain), but are less likely to include codes for cause (e.g., motor vehicle crash or fall), although classification systems exist for describing the cause of injury.

### **Cause** of Injury

The International Classification of Disease-g-Clinical Modification (ICD-9-CM) External Cause of Injury and Poisoning Codes (E-codes) have generally been used to classify cause of injury. Although information on cause of injury is critical in the design and evaluation of injury control-programs, cause of injury codes are not routinely incorporated in the National Health Interview Survey, the National Hospital Discharge Survey, or in statewide hospital discharge abstract systems. Requiring the uniform and routine collection of this information would greatly enhance the utility of these data bases. To ensure the success of this effort, however, the cause of injury should be coded in a data field separate from the description of the nature or type of the injury. Coding the cause in one of the limited number of fields **used** for describing the nature of the injury is not appropriate because it leads to underutilization of the cause of injury codes, especially if multiple injuries and/or comorbidities are present.

The Committee to Review the Status and Progress of the Injury Control Program at the Centers for Disease Control (1988) states: "Incorporation of E-codes into hospital records and hospital discharge data bases is essential for determining the causes and incidence of injuries. ... Data systems that monitor injury incidence and prevalence and the morbidity and mortality associated with injury, as well as the causes of injury, are critical to the development of effective interventions" (Committee, 1988, p. 50).

***RECOMMENDATION: Require the use of both cause and nature or type of injury codes for all hospital discharge data systems and for all data bases having the potential of providing national injury estimates. Require a separate field for the cause of injury code.***

## Standardization of Injury Coding

Four additional coding conventions are employed by various federal and state agencies and private organizations.

- ICD-N and ICD-E codes. The most widely used coding convention is the International Classification of Diseases (ICD-9-CM), Nature of Injury Code (N-code). The N-codes classify injury and poisoning (Codes 800-999) according to the nature or type of injury and the body part injured (e.g., sprains and strains and fractures of neck and trunk, lower limb). Currently, the sample surveys conducted by the National Center for Health Statistics (NCHS) -- the National Health Interview Survey, the National Hospital Discharge Survey, the National Ambulatory Care Survey, and the National Medical Care Utilization and Expenditure Survey -- employ the N-codes in classifying the nature of injury. The Health Care Financing Administration requires the use of N-codes for reimbursement purposes. In current plans for the 10th revision, the ICD will not employ the 'N-code' and 'E-code' terminology. Chapters replacing these codes will be entitled "Injuries, Poisonings, and Certain Consequences of External Injuries" and "External Causes of Mortality and Morbidity" (Israel, 1989).
- ANSI Z16.2 codes. The Z16.2 coding system of the American National Standards Institute (ANSI) is used by insurers to code injuries for Workers' Compensation. The basic data on workplace injury are derived from the Supplemental Data System of the U.S. Department of Labor and the Detailed Claims Information data base of the National Council on Compensation Insurance, as well as numerous state data bases. The scheme is designed for coding from records that lack the diagnostic detail required for ICD coding. A serious gap in the scheme is its failure to code the nature of internal injuries or neurological injuries.
- NEISS codes. The National Electronic Injury Surveillance System (NEISS) operated by the U.S. Consumer Product Safety Commission employs a less diagnostically demanding coding scheme than the ICD to record injury-related visits and admissions to a sample of hospitals. The scheme includes more detailed cause codes than the ICD-E codes. A strength of this scheme is the ability to code from emergency room records that often lack the detail needed for ICD-N coding. A deficiency in the NEISS system is the lack of identification of products by manufacturer and model.

- OIC codes. The National Accident Sampling System operated by NHTSA uses Occupant Injury Codes (OIC)which generally are more detailed than ICD codes and differentiate injuries according to threat to life. Nature or type of injury codes are not recorded.

***RECOMMENDATION: Standardize coding of injuries by multiple coding of nature and cause of injury for all data bases intended to provide national estimates of injury. Agency needs for specific information can be met by the addition of customized codes.***

## Injury Severity Measurement

Injury severity determination provides an important tool for classifying injuries according to their potential threat to life or residual impairment. Classification of injuries by severity is central for monitoring patterns of injury and evaluating alternative strategies for prevention and treatment. Injury severity determination serves trauma care systems by assisting prehospital triage, clinical management, outcome evaluation, and medical research on injury.

A variety of scores and scales have been developed over the years to determine injury severity (Cales, 1986; MacKenzie, 1984; Gustafson, 1983). Included are the Abbreviated Injury Scale (AIS), the Injury Severity Score (ISS), the Trauma Index, the IPCAR Score, the Illness-Injury Severity Index, the Trauma Score, the Glasgow Coma Scale, the CRAMS Scale, the Therapeutic Intervention Scoring System (TISS), the Acute Physiology and Chronic Health Evaluation (APACHE), and the Hospital Trauma Index, to name a few.

Although significant advances have been made in severity of injury scaling in the past three decades, substantial limitations persist. The Abbreviated Injury Scale (AIS) is the most widely recognized severity scoring system based on anatomic descriptors. A major drawback to incorporating the AIS in large population-based data systems, however, has been the need to review the entire medical record for adequate scoring. The recent development of computer software that translates ICD-9-CM codes into AIS severity scores affords the opportunity to classify injuries according to AIS severity using computerized hospital discharge abstracts. This conversion is, however, based on many assumptions due to the lack of specificity in the ICD-9CM nature of injury codes. Modest changes to the ICD classification would enhance the compatibility of the ICD and AIS classification systems and provide population-based injury information specific to severity as measured by the AIS.

***RECOMMENDATION: Ensure tke compatibility of tke ICD and AIS systems for classifying anatomic description of injury to permit tke computerized conversion from ICD to AIS for assigning severity scores on national data bases.***

## Impairment Classification Systems

The AIS is primarily a measure of severity based on potential threat to life. There is no comparable measure based on expected levels of impairment. Impairment-based severity scales are critical, however, in determining the direct and indirect costs of injury and in evaluating the impact of alternative therapies and programs on the prevention of disability.

Injury often leads to impairments that reduce the capacity for functioning. Impairment is a chronic physiological, psychological, or anatomical abnormality of bodily structure or function caused by injury or disease (Rice and LaPlante, 1988). The World Health Organization has proposed a classification entitled International Classification of Impairments, Disability, and Handicap (ICIDH) (WHO, 1980). The ICIDH is an extension of the taxonomic approach of the widely used International Classification of Diseases (ICD). The WHO (1980) manual treats impairment as a classification of disturbances at the level of the organ, disability as a taxonomy of individual limitations, and handicap as a classification of circumstances that place individuals with disabilities at a disadvantage relative' to their peers when viewed from societal norms.

The purpose of the ICIDH is to provide a framework for the organization of information about the consequences of disease and injury. There is substantial disagreement on the extent to which the ICIDH has achieved this goal (Haber, 1989). Moreover, the use of the ICIDH as a classification system in the United States has been limited.

The classification of impairment can be used as a measure of societal impact as it directly measures the reduction in the ability of disabled people to live at full capacity. There have been several approaches to the development of injury impairment factors in this country (Hirsch, 1983; Luchter, 1987).

***RECOMMENDATION: Conduct research on tke development and evaluation of a valid and useful classification sysiem for impairments tkat will meet tke needs of researchers, program administrators, and rehabilitation specialists.***

## Data Needs

The present study has utilized currently available data on cost, incidence, severity, and consequences in an effort to identify the magnitude and range of lifetime costs of injury in the United States. The data were found to be lacking in many respects. More complete and accurate measurement of the incidence of injury and related cost is required to target injury prevention and control programs in the future. The present research points the way to the following recommendations on methods to obtain better data to improve this measurement.

### Injury Surveillance

Timely injury data are needed to identify important shifts in rates and patterns of injury, to identify newly emerging problems, and to form the basis for planning, analysis, and evaluation of injury control efforts. Information on injuries and events relating to injury may be obtained from a variety of sources. Examples of national databases designed for the surveillance of specific types of injury include: the Fatal Accident Reporting System (FARS), the National Accident Sampling System (NASS), the National Electronic Injury Surveillance System (NEISS), and the Survey of Occupational Injuries and Illnesses. These surveillance systems have provided important and useful information for monitoring the epidemiology of specific types of injury. Criticisms have nevertheless been raised regarding the completeness of coverage, the scope of content, and the high cost of these systems (Panel on Occupational Safety and Health Statistics, 1987; U.S. GAO, 1988).

Other sources that provide data on injuries, although not designed specifically for the purpose of injury surveillance, are surveys from the National Center for Health Statistics and mortality data from the national vital statistics system. Two specific surveys of relevance are the National Health Interview Survey (NHIS) and the National Hospital Discharge Survey (NHDS). These surveys can provide uniform data on all injuries regardless of cause or nature, but their utility for surveillance is limited by their mode of collection. As large national surveys, they are collected and tabulated on an annual basis with data appearing approximately 9-12 months after the end of the data collection year. Such a design does not lend itself to some surveillance needs.

Mortality data from the national vital statistics system are also general purpose statistics that can provide information on injuries. These data, based on information reported on death certificates, are of two types: final and provisional. Final data, based on counts of all deaths in the United States, include both external causes and nature of injury information, as well as place of injury. The fact that final data are tabulated only once a year limits their usefulness for surveillance.

In contrast, provisional mortality data are tabulated monthly, with an approximate four-month lag from the time of death to the publication of aggregate statistics in the *Monthly Vital Statistics Report* (MVSR) of the National Center for Health Statistics. Provisional data include cause of injury codes but not type of injury. A special adaptation of provisional mortality data for surveillance purposes is the Mortality Surveillance System (MSS) introduced into the *Monthly Vital Statistics Report* in 1989 (U.S. NCHS, 1989a). This is a graphic presentation and brief expository text of trends in selected causes of death, including injury, by age, sex, and month. The presentation is designed to graphically identify major departures of mortality patterns from the underlying trend and seasonal pattern in mortality, with a reasonably short time delay.

Some state medical examiner and hospital discharge record systems have the potential for providing timely, detailed mortality and morbidity data for the most severe injuries. With the increasing availability of statewide hospital discharge abstract databases, new opportunities exist for developing timely and cost efficient surveillance systems. Currently, 28 states maintain databases that contain, at a minimum, the items incorporated in the Uniform Hospital Discharge Data Set (UHDDS). When linked to death certificate data, hospital discharge abstracts provide population-based data on a significant subset of all injuries -- namely, those that are serious enough to result in death or hospitalization. An important advantage of these statewide databases is that they include all hospital discharges and provide data specific to the state and its local communities.

No single national database is likely to be adequate for the comprehensive surveillance of injury. An effective, cost-efficient strategy of surveillance will depend on a combination of methods for gathering information from a variety of sources. Coordination of these efforts is essential to ensure uniform definitions and comprehensive surveillance of all types of injuries regardless of their severity or cause.

***RECOMMENDATION: Develop a national coordinated program of injury surveillance for the quick identification and control of outbreaks of specific injuries and for epidemiologic research on injuries. For this effort, rely on the integration of uniformly collected data derived from multiple sources at both the national and local levels. To compensate for the time lag inherent in national data bases, states in which the medical examiner and/or hospital discharge data have the necessary quality and currency could monitor their data as an early warning system. Provide resources to achieve these objectives.***

## Population-Based Data on Injury

The National Health Interview Survey (NHIS) conducted by the National Center for Health Statistics is a continuing, nationwide, household interview survey. A probability sample of households in the civilian noninstitutionalized population of the United States is surveyed each week by interviewers from the Bureau of the Census. The survey provides data on the incidence of injury and acute conditions, limitation of activity, persons injured, hospitalizations, disability days, physician visits, and the prevalence of selected chronic conditions. It contains no data on circumstances or cause of injury. The NHIS 'core' set of questions has remained virtually unchanged from year to year.

To provide data on special topic areas in addition to the basic NHIS data, supplements to the NHIS have been conducted annually. Topics covered by the supplement vary from year to year. A special supplement on injury conducted in 1970-72 and 1975 focused on the cause of injury. In 1985, the Health Promotion and Disease Prevention Supplement included questions on occupant restraints, smoke detectors, and hot water temperature settings. In 1987, a supplement conducted on cancer risk factors included questions on occupational exposure. In addition, a 1988 supplement on occupational health included an extensive set of questions on work injuries and work-related health conditions. The 1990 Health Promotion and Disease Prevention supplement will repeat the questions on the 1985 supplement and add questions about adolescent use of helmets and other guards when engaged in sports. A comprehensive NHIS supplement on injury should be conducted to collect detailed information on the cause of injury, the involvement of consumer products, whether the injury was job related, the nature of the resulting disability, and the medical care and rehabilitation services provided.

***RECOMMENDATION: Expand core NHIS questions relevant to injury to describe the circumstances of injury. In addition, conduct a comprehensive supplement to the NHIS on incidence, medical care, rehabilitation, and disability related to injury. Provide adequate finds for the expansion of the core NHIS questions and for the conduct of a comprehensive injury supplement.***

## **Longitudinal** Studies

Longitudinal data sets are increasingly essential to provide dynamic descriptions of injury and the short- and long-term consequences on individual injured persons, their families and friends, the community, and society. Injury refers to damage inflicted on a body by some

traumatic, usually external, force. Injured individuals may undergo physical, mental, economic, and emotional changes that prevent, disrupt, or permanently change their ability to carry on their usual activities. They may incur large and repeated medical and rehabilitation expenses. They may develop impairments, disabilities, and handicaps that require personal assistance in daily living and major changes in the means of livelihood. Injury may also entail loss of income, social status, or social contacts. It is essential that dynamic descriptions of injuries and their consequences be fully understood and documented as a basis for the formulation of policy in the areas of prevention, treatment, rehabilitation, and research. Very few longitudinal studies of severely injured persons have been conducted to provide improved estimates of lifetime costs.

**Injured Persons in the General Population**

The major national source of population-based data on injury is the National Health Interview Survey (NHIS). Conducted continuously since 1957, the NHIS provides national data annually on the incidence of unintentional injury, the prevalence of acute and chronic conditions and impairment, the extent of disability, the utilization of health care services, and other health-related topics. The National Center for Health Statistics conducts targeted population surveys (TPS), which are follow-up studies of NHIS respondents who report specific conditions at the time of the household interview or represent a certain demographic characteristic. Examples of TPS are the Post-Polio Survival Survey, an epidemiologic study of 800 persons identified during the 1987 NHIS as being at risk for post-polio syndrome, and the Work Injury Followback Survey, a followback study of about 200 persons reporting occupational injuries during the two-week reference period prior to the NHIS interview.

A sample of injured persons in the NHIS could be selected and followed periodically to track the physical and economic consequences of injury. Precedent for this approach is the Longitudinal Study of Aging (LSOA), a family of surveys based on the Supplement on Aging (SOA) to the 1984 National Health Interview Survey. The SOA provides comprehensive information on family structure, housing, use of community and social supports, occupation and retirement, functional limitations, and conditions and impairments. All respondents are followed through death records from the National Death Index, acquisition of cause of death codes from the death certificates, and linkage with Medicare files from the Health Care Financing Administration (HCFA). Subsamples have been selected for re-interviews in 1986, 1988, and 1990 to measure changes in functioning,

provision of help, living arrangements, and use of medical and nursing home care. The LSOA provides an excellent means of monitoring the long-term impact of injuries, especially falls, on disability impairment and mortality of elderly people.

***RECOMMENDATION: Conduct, with adequate finding, a follow-up survey of respondents to the proposed NHIS Injury Supplement to determine the long-term physical and economic consequences of injury in the general population. Oversample respondents with severe injury resulting in long-term disability.***

## Patients Treated in Trauma Centers

The modern trauma center is the locus for treatment of and the primary source of data on moderately to severely injured persons in the United States. Trauma centers provide a full array of services with a complete team of qualified personnel available on a 24-hour basis.

***RECOMMENDATION: Develop a series of well-designed, closely coordinated studies of the long-term physical, psychological, and economic consequences of patients treated in several trauma centers throughout the nation.***

## Cost Data

For almost all types of medical care expenditure (e.g., hospital care, physician services, drugs and appliances, and rehabilitation), current data are unavailable from national data sources. Data from the 1980 National Medical Care Utilization and Expenditure Survey (NMCUES) conducted by the National Center for Health Statistics are used in this report by inflating per person or per visit 1980 costs to 1985 levels on the basis of the relevant medical care component of the Consumer Price Index. The NMCUES is a national probability sample of the noninstitutionalized population. About 10,000 households were sampled and five interviews conducted over a period of 15 months to obtain information on medical care utilization, expenditure, and other health-related information.

The National Medical Expenditure Survey (NMES) was conducted by the National Center for Health Services Research and Health Care Technology Assessment (NCHSR and HCTA) in 1987 and 1988. NMES consisted of six rounds of data collection covering an 18-month period. The household sample consisted of 14,000 households including oversamples of Blacks, Hispanics, low-income people, and people with functional impairments. Data collected includes expenditures and

sources of payment for all major forms of medical care, sociodemographic and economic characteristics of respondents, insurance coverage of respondents, and access to medical care. This survey will be a rich source of cost data for injury as well as for other illnesses and conditions. The data were not yet available for use in the present study.

***RECOMMENDATION: Conduct, with adequate finding, a national medical expenditure suwey periodically, preferably every five years, to provide current expenditure data for the nation.***

## Occupational Injury

Occupational injury is a major cause of illness and premature death in the United States. The Bureau of Labor Statistics (BLS) is responsible for collecting statistics on occupational injury and illness. It has been alleged that the number of occupational injuries reported by the BLS is seriously underreported because employers have a strong incentive not to report injuries. A recent study by the Panel on Occupational Safety and Health Statistics (1987) of the National Academy of Sciences Committee on National Statistics concludes that the BLS data systems are inadequate for providing the Occupational Safety and Health Administration (OSHA) with the data it needs for maintaining an effective program for prevention of workplace injury and illness. The Committee also concludes that there is no single agreed upon estimate for the number of occupational fatalities in the United States. Because of the inadequate data available on occupational injuries and fatalities, separate cost estimates for these injuries are not made herein.

The Panel report includes 24 important recommendations relating to the revision and improvement of existing BLS data systems, use of other data systems, and confidentiality issues relating to survey data on individual establishments. The first recommendation is that the "BLS annual survey should be modified to permit the collection of detailed data on severe occupational injuries categorized as injuries resulting in death, hospitalization, or outpatient surgery" (Panel, 1987, p. 103).

***RECOMMENDATION: Implement the recommendations of the National Academy of Sciences Panel on Occupational Safety and Health Statistics of the Committee on National Statistics as soon as possible to provide improved and accurate data on occupational injuries and fatalities.***

### Firearm Injury Data

Firearms are the second leading cause of injury death in the United States. In the past, firearm injuries were considered the sole responsibility of the police, with no role allocated to public health departments. Although the National Crime Survey collects information on firearms involved in crimes, no existing source provides the necessary information on all firearm deaths: homicide, suicide, and unintentional death. The Fatal Accident Reporting System (FARS) data base, administered by the NHTSA, provides an excellent model of such a system. The FARS collects information on fatal motor vehicle crashes categorized by the characteristics of the accident, the vehicle/driver, and the persons involved. The FARS uses some or all of the following data sources: police, hospital, medical examiner/coroner, and EMS reports; state vehicle registration, driver licensing, and highway department files; and vital statistics documents and death certificates (U.S. National Highway Traffic Safety Administration, 1988a). A system on firearm fatalities, comparable to FARS, would become a primary resource for documenting the firearm problem, and for designing prevention strategies.

***RECOMMENDATION: Require that firearm injuries, in addition to being reportable to the police, be reportable to health departments. Place greater emphasis on coding the type of firearm on the death certificate. Develop a national fatal firearm injury reporting system, comparable to FARS, with sufficient data for documenting the firearm problem and designing prevention strategies.***

## Treatment and Rehabilitation

Medical care provided to injured persons places a financial strain on the health care system. To relieve the enormous economic burden of disability on the society and on individuals and families, treatment and rehabilitation research and program development are essential.

### Trauma Care

Communications systems are needed for medical management at the site of injury and for rapid delivery of the patient to the hospital for prompt medical care. When a severely injured person arrives at the hospital or trauma center, an experienced team of specialists with necessary back-up facilities, such as a blood bank, is required to avoid unnecessary morbidity, mortality, and residual disability. Since the 1970s, trauma care has become increasingly specialized. Guidelines for

trauma center designation developed by the American College of Surgeons have permitted systems of regional trauma care to be designed and implemented. Recently, economic pressures on trauma centers due to uncompensated care have threatened the viability of such systems and centers. While trauma centers treat the most severely injured patients, hospitals with no trauma service continue to treat less severely injured patients. Studies are needed to examine the economic and treatment issues involved in trauma systems in order to assure that trauma care is provided most efficiently and effectively. The talents of epidemiologists, statisticians, biomedical engineers, trauma and rehabilitation physicians, behavioral scientists, and health economists will aid in this process.

***RECOMMENDATION: Conduct collaborative interdisciplinary research to identify and evaluate factors in trauma care that produce optimal results.***

## Rehabilitation

Rehabilitation is the process by which biologic, psychologic, and social functions are restored or developed to permit an injured person to achieve maximal personal autonomy. Rehabilitation is achieved both through functional change in the injured person and through changes in the physical and social environment. More persons survive major injuries today than in the past and need functional restoration of cognition, sensation, movement control, and mobility after brain, spinal cord, and musculoskeletal injuries. Rehabilitation units have developed improved procedures for amputation, prosthetics, and management of multiple musculoskeletal injury and neurotrauma. Progress has been made in reconstructive surgical procedures for improved function and correction of deformities. The Independent Living Movement provides community resources and role models for people living with disabilities.

Resources are currently devoted to the development of expensive, high-tech rehabilitation devices that are not used because they are not affordable or reliable enough to meet the needs of the average person living with disabilities. Additional research and development resources must be devoted to the design and production of affordable, reliable assistive devices.

***RECOMMENDATION: Greatly expand research for the development and evaluation of cost-effective model systems of rehabilitation and for the design and production of affordable and reliable assistive devices to serve the needs of people with disabilities. Involve people with disabilities in the decision-making process.***

## *Appendix A*

# Injury Diagnoses

### *Classification of ICD-9-CM Codes (E800-E999)* by Cause and Intent*

| **Cause** and Intent | ICD-9 **E-Code** |
|---|---|
| ***Motor Vehicles*** | |
| Traffic and non-traffic accidents | E810-E825 |
| Suicide and self-inflicted injury by crashing of motor vehicle | E958.5 |
| Injury by crashing of motor vehicle, undetermined whether accidentally or purposely inflicted | E988.5 |
| ***Falls*** | |
| Accidental falls | E880-E888 |
| Suicide and self-inflicted injuries by jumping from high place | E957 |
| Assault by pushing from a high place | E968.1 |
| Falling from high place, undetermined whether accidentally or purposely inflicted | E987 |
| ***Firearms*** | |
| Accident caused by firearm missile | E922 |
| Suicide and self-inflicted injury by firearms and explosives | E955 |
| Assault by firearms and explosives | E965 |
| Injury due to legal intervention by firearms | E970 |
| Injury by firearms, undetermined whether accidentally or purposely inflicted | E985.0-E985.4 |
| ***Poisonings*** | |
| Accidental poisoning by drugs, medicinal substances, and biologicals; other solid and liquid substances, gases, and vapors | E850-E869 |

| | |
|---|---|
| Suicide and self-inflicted poisoning by solid or liquid substances, gases in domestic use, or other gases and vapors | E950-E952 |
| Assault by poisoning | E962 |
| Injury due to legal intervention by gas | E972 |
| Poisoning by solid or liquid substances, gases in domestic use, or other gases, undetermined whether accidentally or purposely inflicted | E980-E982 |

***Fire/Burns***

| | |
|---|---|
| Accidents caused by fire and flames, hot substance or object, caustic or corrosive material, and steam | E890-899, E924 |
| Suicide and self-inflicted injury by burns, fire, or scald | E958.1, E958.2 |
| Assault by fire or hot liquid | E968.0, E968.3 |
| Injury by burns, fire, or scald, undetermined whether accidentally or purposely inflicted | E988.1, E988.2 |

***DrowningslNear Drownings***

| | |
|---|---|
| Accidental drowning and submersion, including accident to watercraft causing submersion, or other accidental submersion or drowning in water transport accident | E830, E832, E910 |
| Suicide and self-inflicted injury by submersion | E954 |
| Assault by submersion | E964 |
| Submersion, undetermined whether accidentally or purposely inflicted | E984 |

***Other***

| | |
|---|---|
| Railway accidents | E800-E807 |
| Road vehicles accidents (other than motor vehicles) | E826-ES29 |
| Water transport accidents causing injury other than submersion or drowning | E831, E833-E838 |
| Air and space transport accidents | E840-E845 |
| Vehicle accidents not elsewhere classifiable | E846-E849 |
| Accidents due to natural and environmental factors | E900-E909 |

| | |
|---|---|
| Accidents caused by suffocation and foreign bodies | E911-E915 |
| Other accidents, including falling objects, striking against or struck by objects or persons, caught in between objects; accidents caused by machinery, cutting or piercing instruments, or caused by explosion of pressure vessel | E916-E921 |
| Accidents caused by explosive material, electric current, exposure to radiation | E923, E925, E926 |
| Overexertion and strenuous movements | E927 |
| Other and unspecified environmental and accidental causes | E928 |
| Late effects of accidental injury | E929 |
| Suicide and self-inflicted injury by hanging, strangulation, and suffocation, cutting and piercing instruments, extremes of cold, electrocution, crashing of aircraft, caustic substances (except poisoning), other specified and unspecified means; | E953,E956,E958.3 E958.4,E958.6-E958.9 |
| Late effects of self-inflicted injury | E959 |
| Homicide and injury purposely inflicted by other persons, including fight, brawl, rape, assault by corrosive or caustic substance (except poisoning), hanging and strangulation, and cutting and piercing instruments | E960,E961,E963, E966 |
| Child battering and other maltreatment | E967 |
| Assault by other means, including striking by blunt or thrown object, criminal neglect, and other specified and unspecified means | E968.2,E968.4, E968.8,E968.9 |
| Late effects of injury purposely inflicted by other person | E969 |

| | |
|---|---|
| Legal intervention by explosives, blunt object, cutting and piercing instrument, other specified and unspecified means (excluding firearms, or gas) | E971,E973-976 |
| Late effects of injuries due to legal intervention; | E977 |
| Legal execution | E978 |
| Undetermined whether accidentally or purposely inflicted: hanging, strangulation, or suffocation, injury by explosives, cutting and piercing instruments, or other and unspecified means (except bums, fires, scalds, and motor vehicle crashes) | E983,E985.5, E985.6,E986,E988.0, E988.3,E988.4, E988.6-E988.9 |
| Late effects of injury, whether accidentally or purposely inflicted | E989 |
| Injury resulting from operations of war | E990-E998 |
| Late effect of injury due to war operations | E999 |

*Excludes misadventures to patients during surgical and medical care (E870-E879), drugs, medicinal and biological substances causing adverse effects in therapeutic use (E930-E949). For hospitalized injuries, E-codes E929, E959, E977, E989 are excluded.

## *Appendix B*

# Methodology

## Estimation of Lifetime Cost

*(Chapter 2)*

The lifetime cost of injury for 1985 is estimated as the product of two components: incidence (the number of new injuries occurring in 1985) and lifetime cost per person. The model of per person cost is discussed here.

### Direct Cost

The direct cost of injury is the value of resources that could be allocated to other uses in the absence of injury, such as expenditures for hospitals and nursing home care, physician and other professional services, rehabilitation, community-based services, drugs and medical equipment. Also included are related expenditures for insurance administration costs, vocational rehabilitation, and home modifications. The direct cost represents actual expenditures for goods and services. In this model, direct cost is calculated as the sum of discounted cost in each year (arbitrarily truncated at 99 years) times the survival probability of the individuals as follows:

$$PVDC = \sum_{n=y}^{99} \left[ \frac{P^{i}_{y,s}(n)\ DC^{1}_{y,s}(n-y+1)}{(1+r)^{n-y}} \right]$$

where:

| | | |
|---|---|---|
| PVDC | = | present discounted value of direct costs per person |
| n | | age of the individual |
| y | = | age at which the individual was injured |

$P^{i}_{y,s}(n)$ = probability that a person of sex s with injury i acquired at age y will survive to age n

s = sex of the individual

DC(n) = direct costs incurred in year n following injury

r = real discount rate

## Morbidity Cost

The morbidity cost is represented by wages lost by people who either are unable to work at all because of injury and disability or cannot work at a level of full effectiveness; for persons too sick to perform their usual housekeeping services an imputed value of these services is included. Calculating the morbidity cost involves applying average earnings by age and sex to work-loss years for those currently employed, attaching a dollar value to housekeeping services lost because of illness, and applying labor force participation rates and earnings to persons who are too sick to be employed. In this model, morbidity due to injury is calculated as the number of days of restricted activity times average daily earnings, real or imputed, adjusted to reflect the probability that the person will survive, as follows:

$$PV_{morbidity} = \sum_{n=y}^{99} P^{i}_{y,s}(n) D(n) \frac{\left[ Y_s(n) E_s(n) + Y^{h}_{s}(n) E^{h}_{s}(n) \right]}{365} \times \frac{(1+g)^{n-y}}{(1+r)^{n-y}}$$

where:

PVmorbidity = present discounted value of earnings losses due to injury per person

D(n) days of restricted activity during the year of a person currently age n

$P^{i}_{y,s}(n)$ = probability that a person of sex s with injury i acquired at age y will survive to age n

| | | |
|---|---|---|
| $n$ | | age of the individual |
| $Y_S(n)$ | = | mean annual earnings of an employed person of sex s and age n |
| $E_S(n)$ | = | proportion of the population of sex s and age n that are employed in the labor market |
| $Yh_S(n)$ | | mean annual imputed value of homemaking services of a person of sex s and age n |
| $Eh_S(n)$ | | proportion of the population of sex s and age n that are keeping house |
| $g$ | = | rate of increase of labor productivity |
| $Y$ | | age at which the individual was injured |
| $r$ | = | real discount rate |

For fatal and hospitalized injuries, restricted activity time and earnings were calculated on an annual (not daily) basis.

Mortality Cost

Premature mortality is the current monetary value of future output lost due to premature death. The estimated cost or value to society of all deaths is the product of the number of deaths and the expected value of an individual's future earnings with sex and age taken into account. This method of derivation takes into consideration life expectancy for different age and sex groups, changing pattern of earnings at successive ages, varying labor force participation rates, imputed value for housekeeping services, and the appropriate discount rates to convert a stream of costs into its present worth. Mortality due to injury is calculated as the earnings that the individual would have had in the absence of injury, as follows:

$$PV_{mortality} = \sum_{n=y}^{99} P_{y,s}(n) \left[ Y_s(n) \; E_s(n) + Y_s^h(n) \; E_s^h(n) \right] \times \frac{(1+g)^{n-y}}{(1+r)^{n-y}}$$

where:

$PV_{mortality}$ = present discounted value of loss due to injury death per person

$P_{y,s}(n)$ = probability that a person of sex s and age y will survive to age n

i = type of injury

Y = age at which the individual was injured

s = sex of the individual

n = age of the individual

$Y_s(n)$ = mean annual earnings of an employed person ofsexsandagen

Es(n) = proportion of the population of sex s and age n that are employed in the labor market

$Y^h_s(n)$ = mean annual imputed value of homemaking services of a person of sex s and age n

$E^h_s(n)$ = proportion of the population of sex s and age n that are keeping house

g = rate of increase of labor productivity

r = is the real discount rate

## Methods and Assumptions of Cost and Savings Analysis
(Chapter 5)

Most of the assumptions and methods in the cost and savings analysis are specified in the text. This appendix notes the steps in the analysis.

The analysis of savings that could be accomplished by injury control programs included the following steps:

1. Search the scientific literature for research that demonstrates the effect of programs on injuries. Use only research that deals with programs that have not been fully implemented and that demonstrates an effect on injury rates. Studies of attitudes and behavior thought to be related to injury were excluded unless actual effects on injury rates were found. Where several studies were done and the results differed, a judgment was made about the scientific validity of the research. For example, the results of a controlled experiment were given more weight than a quasi-experiment (comparison group without random assignment) which, in turn, was given more weight than a before-after study.

2. Obtain information on the cost of implementing a given program. As noted in the text, this was possible on only a fraction of the identified programs. In some cases, such as costs of law enforcement to implement a law, the incremental costs are unknown. In others, the extent of implementation of programs that have been implemented partially, such as physician's counseling, is unknown.

3. Estimate the distribution of injury severity that would be reduced by the program. In most cases, this was accomplished by assuming that the program would affect the known distribution of severity of injuries relative to fatal injuries, as noted in the text in each case. In certain instances, special computer tabulations were done to obtain the injury estimates. These included the number of people killed in crashes where a driver was a certain age and the number of motorcyclists killed in states without helmet laws, both tabulated from the Fatal Accident Reporting System file for 1985. The estimated proportionate reduction in injuries of specified severity to be expected from implementation or increase in a given program was then multiplied by the number of injuries of a given severity that the program could be expected to reduce.

4. Where the necessary elements could be reasonably estimated, costs of the injuries that could be prevented by a given program were estimated by multiplying the number of injuries of a given severity expected to be reduced by the costs of the injuries of that severity. Two costs are employed -- the human capital costs reported in Chapter 2, and the willingness-to-pay costs reported in Chapter 4. The following

computer program run in BASIC can be used to estimate savings of motor vehicle occupant injuries in a given area (such as a state) where the deaths in a given category are known:

```
10    DATA 104.588,8.97,1.99,0.32,.1065,1
20    DATA 1570,30423,40014,170543,741039,401302
30    DATA 3000,31000,115000,375000,1525000,2000000
40    DIM RATIOD(6),COST1(6),COST2(6),INJ(6),SAV1(6),
      SAV2(6)
50    FOR I=1 to 6
60    READ RATIOD(I)
70    NEXT I
80    FOR I=1 to 6
90    READ COST1 (I)
100   NEXT I
110   FOR I=1 to 6
120   READ COST2(1)
130   NEXT I
140   INPUT DEATHS
150   LPRINT "DEATHS=",DEATHS
160   FOR I=1 to 6
170   INJ(I)=RATIOD(I)*DEATHS
180   SAVl(I)=INJ(I)*COSTl(I)
190   SAV2(I)=INJ(I)*COST2(1)
200   TOTl=TOTl+SAVl(I)
210   TOT2=TOT2+SAV2(1)
220   LPRINT I,INJ(I),SAVl(I),SAV2(1)
230   NEXT I
240   TOTl=TOT1/1000000
250   TOT2=TOT2/1000000
260   LPRINT "HUMAN CAPITAL= $",TOTl,"MILLION,
      WILLINGNESS TO PAY=$",TOT2,"MILLION"
270   TOTl=0
280   TOT2=0
290   GOT0 140
300   END
```

For example, if 600 car occupants died in a given state and a belt-use law would reduce those deaths 7 percent, the number of deaths to be reduced would be 600 x .07 or 42. Enter 42 at the ? prompt when the program is run and the estimated savings will be printed.

5. Potential savings of each of these types of costs are estimated by subtracting the cost of implementing or incrementing a given

intervention from the estimated costs of the injuries that could be reduced by the intervention.

## Methodology for Case Studies

(Chapter 6)

In-depth interviews were conducted with injury survivors and their family members in order to discover the impact of injury and disability on individuals and families. The anthropological technique of open-ended interviewing was employed. This interpretive analytic technique is widely used in the social sciences when the goal of the project is to collect richly textured information from a small number of subjects. With this technique, the group under investigation may not be widely representative of the larger population, but the investigator is able to gain a deeper knowledge of meanings in that group. Anthropological interpretation generalizes in a different way from survey or other positivist approaches. It describes individuals systematically and accurately in order to highlight patterns and principles. Findings come not through explicit statements about specific variables or generalities, but rather through concrete portrayal of individual events and lives. This was not a survey and no survey techniques were used. Because the aim of this anthropological part of the project was not to test a hypothesis, no variables were isolated or tested. The goal was to interpret data collected about the meaning of injury and disability over the long term.

The interviewer was interested in hearing what the subjects perceived as meaningful events and experiences and the way in which they interpreted what happened. Thus, facts were not checked nor were any external measures of validity employed. Two to three hours were spent with each subject. All interviews were informal in style and were intended to be relatively nondirective. No precise preworded questionnaire was used, though an interview topic guide, shown below, was followed. Questions were designed to get people to talk about what was meaningful to them, rather than to have specific queries answered. A detailed questionnaire would have forced survivors and families to structure their answers according to researchers' priorities rather than their own. The guiding principle was to encourage people to talk about what had happened to them from their own point of view.

Interviews elicited information on the following topics: details of how the injury occurred; the acute care and rehabilitation experience; use of medical, legal, and social services; impact of the injury on family dynamics and employment; feelings about disability, recovery, loss,

and disruption; the changed self; and expressed needs over the post-injury years. Thus, interviews centered on the important events -- as perceived by the subject -- that had happened since the injury, and the meaning of those events to the injured person or family member. Interviews were undertaken in a spirit of friendliness and honesty. Data obtained in this manner were spontaneous, thoughtful, and usually self-reflective. Information about injury and disability was anchored in the occurrences of everyday life and the social and economic forces that impact the individual's immediate environment. All interviews, conducted between January and June 1988, were tape-recorded and the tapes were fully transcribed.

## Interview Guide for Case Studies

Demographic Background

1. Age
2. Principal source of income
3. Level of education
4. Religious affiliation
5. Current occupation
6. Marital status
7. Who live with currently. Where live currently.

The Injury

1. How did the injury happen? Where? When? Describe.
2. What happened immediately following? Who arrived on the scene? When? What did they do?

Post-Injury Acute Care Hospitalization

1. How long hospitalized?
2. Types of treatment?
3. Total costs? How covered?

Rehabilitation and Other Post-Hospital Treatment

1. Kinds of home care, outpatient rehabilitation therapies since injury? Costs? How covered?
2. How long did formal rehabilitation services last?
3. What about other types of treatment services? Costs? How covered?
4. What about related social/psychological services since injury? What services received, for how long, costs, how covered.

5. Were **you** satisfied with your rehabilitation? Want(ed) more? Why?

**Legal Issues**

1. Was a lawsuit involved? Settled in or out of court? Award?
2. Workers' compensation involved? Describe.

**Employment**

1. Describe any job/career changes since injury. Lose job? Modify/change jobs? Over what time period? Alter type of work, amount of work, or work schedule? Resulting salary changes?

**Living Standard**

1. Could you describe to me in what ways your standard of living has changed each year since the injury?

**Household Arrangements**

1. Who assists with physical care? To what extent?
2. Who is responsible for scheduling these activities?
3. Who cooks, cleans house, shops, home repairs, etc.?
4. How have these activities changed since injury?
5. What activities have you had to give up since injury?

**Perceptions of Adjustment**

1. How have you been feeling since the injury? (Probes for physical and emotional factors)
2. What is your day like? Describe from beginning to end.
3. What kinds of changes have you noticed?
4. Do you feel any basic changes in your life have occurred? Describe.
5. What are your plans for the future?
6. What does your family think about this?

**Attitudes Toward Disability and Dependence**

1. How are your abilities limited now? How has this changed since injury?
2. What do you do, can you do, about these limitations? How has this changed over time?
3. How is it for you to depend on (family, other caregiver) for aspects of personal hygiene? Aspects of daily routine? Recreation? Financial security? Social interaction? Other? (How is it to have patient dependent upon you for the above?)

Overall Adjustment

1. What new household routines have been established since injury?
2. What devices or home reconstructions would make life easier, safer?
3. Who takes over tasks patient can no longer perform?
4. Have you established any new routines to make patient care easier on other family members? What?
5. What arrangements have to be made for continuing with all forms of therapy and treatment?
6. What financial, or insurance coverage arrangements have you had to make, if any?

*Appendix C*

# Detailed Tables

***Table*** C-3

United States Civilian Population Estimates, 1985

| Age Group | Both Sexes | Males | Females |
|---|---|---|---|
| Total | 237,055,667 | 114,626,333 | 122,429,667 |
| 0-4 | 17,995,333 | 9,208,000 | 8,788,000 |
| 5-14 | 33,919,333 | 17,367,667 | 16,551,667 |
| 15-24 | 38,765,000 | 19,254,667 | 19,511,000 |
| 2544 | 72,926,667 | 35,824,667 | 37,102,000 |
| 45-64 | 44,890,000 | 21,423,000 | 23,466,333 |
| 65-74 | 17,027,333 | 7,484,667 | 9,542,333 |
| 75+ | 11,532,667 | 4,064,000 | 7,469,000 |

* Estimates derived from annualizing 1984,1985 and 1986 estimates

## *Table C-2*

## Motor Vehicles: Number and Rate of Injured Persons by Sex, Age, and Class of Injury, 1985

| Age and Sex | Total Number (thousands) | Total Rate per 100,000 Persons | Fatalities** Number | Fatalities** Rate per 100,000 Persons | Hospitalized Number | Hospitalized Rate per 100,000 Persons | Nonhospitalized Number (thousands) | Nonhospitalized Rate per 100,000 Persons |
|---|---|---|---|---|---|---|---|---|
| Total | 5,372 | 2,266.1 | 45,923 | 19.4 | 523,028 | 220.6 | 4,803 | 2,026.l |
| 0-4 | 112 * | 622.7 | 1,195 | 6.6 | 8,853 | 49.2 | 102 * | 566.8 |
| 5-14 | 328 * | 965.8 | 2319 | 6.8 | 42,277 | 124.6 | 283 * | 834.3 |
| 15-24 | 1,763 | 4548.4 | 14,296 | 36.9 | 164,892 | 425.4 | 1,584 | 4,086.2 |
| 25-44 | 2,064 | 2,830.5 | 15,062 | 20.7 | 185,156 | 253.9 | 1,864 | 2556.0 |
| 45-64 | 793 | 1,767.6 | 6,891 | 15.4 | 77,590 | 172.8 | 709 | 1579.4 |
| 6574 | 203 * | 1,190.2 | 3,016 | 17.7 | 25,642 | 150.6 | 174 * | 1,021.9 |
| 75+ | 109 * | 943.1 | 3,144 | 27.3 | 18,619 | 161.4 | 87* | 754.4 |
| Male | 2,459 | 2,145.2 | 32,454 | 28.3 | 311,496 | 271.7 | 2,115 | 1,845.1 |
| 0-4 | 70 * | 757.9 | 696 | 7.6 | 5,090 | 55.3 | 64* | 695.0 |
| 5-14 | 189 * | 1,089.8 | 1,481 | 8.5 | 27,787 | 160.0 | 160 * | 921.3 |
| 15-24 | 763 | 3,963.2 | 10,696 | 55.6 | 105,411 | 547.5 | 647 | 3360.2 |
| 25-44 | 1,036 | 2,890.5 | 11,424 | 31.9 | 116,105 | 324.1 | 908 | 2534.6 |
| 45-64 | 254 | 1,187.3 | 4,687 | 21.9 | 38,677 | 180.5 | 211 * | 984.9 |
| 65-74 | 70 * | 935.1 | 1,687 | 22.6 | 10,305 | 137.7 | 58 * | 774.9 |
| 75+ | 77 * | 1,892.3 | 1,783 | 43.9 | 8,121 | 199.8 | 67 * | 1,648.6 |
| Female | 2,913 | 2379.3 | 13,469 | 11.0 | 211,532 | 172.8 | 2,688 | 2,195.5 |
| 0-4 | 42 * | 480.9 | 499 | 5.7 | 3,763 | 42.8 | 38 * | 432.4 |
| 5-14 | 138 * | 835.7 | 838 | 5.1 | 14,490 | 87.5 | 123 * | 743.1 |
| 15-24 | 1,000 | 5,125.7 | 3,600 | 18.5 | 59,481 | 304.9 | 937 | 4,802.4 |
| 2544 | 1,029 | 2,772..6 | 3,638 | 9.8 | 69,051 | 186.1 | 956 | 2576.7 |
| 45-64 | 539 | 2,297.4 | 2,204 | 9.4 | 38,913 | 165.8 | 498 | 2,122.2 |
| 65-74 | 133 * | 1390.3 | 1,329 | 13.9 | 15,337 | 160.7 | 116 * | 1,215.6 |
| 75+ | 32 * | 426.5 | 1,361 | 18.2 | 10,498 | 140.6 | 20 * | 267.8 |

* Figure has low statistical reliability or precision (relative standard error exceeds 30 percent)

** Excludes 6,452 deaths occuring in later years due to injuries incurred in 1985

## Table C-3

## Falls: Number and Rate of Injured Persons by Sex, Age, and Class of Injury, 1985

| Age and Sex | Total Number (thousands) | Total Rate per 100,000 Persons | Fatalities** Number | Fatalities** Rate per 100,000 Persons | Hospitalized Number | Hospitalized Rate per 100,000 Persons | Nonhospitalized Number (thousands) | Nonhospitalized Rate per 100,000 Persons |
|---|---|---|---|---|---|---|---|---|
| Total | 12,289 | 5,184.1 | 12,866 | 5.4 | 783,357 | 330.5 | 11,493 | 4,848.2 |
| 0-4 | 1,316 | 7,313.4 | 132 | 0.7 | 34,944 | 194.2 | 1,281 | 7,118.5 |
| 5-14 | 2,484 | 7,322.6 | 79 | 0.2 | 59,697 | 176.0 | 2,424 | 7,146.4 |
| 15-24 | 1,825 | 4,707.6 | 535 | 1.4 | 52,363 | 135.1 | 1,772 | 4,571.1 |
| 25-44 | 2,591 | 3,552.2 | 1,384 | 1.9 | 124,131 | 170.2 | 2,465 | 3380.1 |
| 45-64 | 1,755 | 3,909.5 | 1,815 | 4.0 | 143,156 | 318.9 | 1,610 | 3,386.5 |
| 65-74 | 1,058 | 6,215.2 | 1,728 | 10.1 | 108,549 | 637.5 | 948 | 5,567.5 |
| 75+ | 1,261 | 10,931.7 | 7,193 | 62.4 | 260,518 | 2,259.0 | 993 | 8,610.3 |
| Male | 5,633 | 4,914.2 | 7,002 | 6.1 | 317,980 | 277.4 | 5,308 | 4,630.7 |
| 0-4 | 692 | 7,516.7 | 91 | 1.0 | 20,050 | 217.7 | 672 | 7,298.0 |
| 5-14 | 1,266 | 7,292.1 | 61 | 0.4 | 38,409 | 221.2 | 1,228 | 7,070.6 |
| 15-24 | 1,071 | 5,560.6 | 462 | 2.4 | 36,217 | 188.1 | 1,034 | 5370.1 |
| 25-44 | 1,405 | 3,922.7 | 1,151 | 3.2 | 77,140 | 215.3 | 1,327 | 3,704.2 |
| 45-64 | 716 | 3,341.7 | 1,312 | 6.1 | 62,577 | 292.1 | 652 | 3,043.5 |
| 65-74 | 248 * | 3309.0 | 1,022 | 13.7 | 31,645 | 422.8 | 215 * | 2,872.5 |
| 75+ | 235 * | 5,778.7 | 2,903 | 71.5 | 51,942 | 1,278.1 | 180 * | 4,429.1 |
| Female | 6,656 | 5,436.8 | 5,864 | 4.8 | 465,377 | 380.1 | 6,185 | 5,051.9 |
| 0-4 | 624 | 7,099.9 | 41 | 0.5 | 14,894 | 169.5 | 609 | 6,929.9 |
| 5-14 | 1,217 | 7,354.6 | 18 | 0.1 | 21,288 | 128.6 | 1,196 | 7,225.9 |
| 15-24 | 754 | 3,865.6 | 73 | 0.4 | 16,146 | 82.8 | 738 | 3,782.5 |
| 25-44 | 1,185 | 3,194.5 | 233 | 0.6 | 46,991 | 126.7 | 1,138 | 3,067.2 |
| 45-64 | 1,039 | 4,428.0 | 503 | 2.1 | 80,579 | 343.4 | 958 | 4,082.4 |
| 65-74 | 811 | 8,494.9 | 706 | 7.4 | 76,904 | 805.9 | 733 | 7,681.6 |
| 75+ | 1,026 | 13,735.0 | 4,290 | 57.4 | 208,576 | 2,792.6 | 813 | 10,885.0 |

* Figure has low statistical reliability or precision (relative standard error exceeds 30 percent)
** Excludes 3,604 deaths occuring in later years due to injuries incurred in 1985

## *Table C-4*

## Firearms: Number and Rate of Injured Persons by Sex, Age, and Class of Injury, 1985

| Age and Sex | Total Number (thousands) | | Total Rate per 100,000 Persons | Fatalities** Number | Fatalities** Rate per 100,000 Persons | Hospitalized Number | | Hospitalized Rate per 100,000 Persons | Nonhospitalized Number (thousands) | | Nonhospitalized Rate per 100,000 Persons |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 268 | * | 112.9 | 31,556 | 13.3 | 65,129 | | 27.5 | 171 | * | 72.1 |
| 0-4 | 0 | * | 1.7 | 104 | 0.6 | 199 | * | 1.1 | 0 | * | 0.0 |
| 5-14 | 24 | * | 71.6 | 590 | 1.7 | 2,684 | * | 7.9 | 21 | * | 61.9 |
| 15-24 | 60 | * | 155.6 | 6,879 | 17.7 | 28,420 | | 73.3 | 25 | * | 64.5 |
| 2544 | 164 | * | 225.1 | 13,140 | 18.0 | 26,018 | | 35.7 | 125 | * | 171.4 |
| 45-64 | 12 | * | 27.7 | 6398 | 14.3 | 6,047 | | 13.5 | 0 | * | 0.0 |
| 65-74 | 4 | * | 20.9 | 2547 | 15.0 | 1,010 | * | 5.9 | 0 | * | 0.0 |
| 75+ | 3 | * | 23.0 | 1,898 | 16.5 | 749 | * | 6.5 | 0 | * | 0.0 |
| Male | 216 | * | 188.5 | 26,366 | 23.0 | 56,718 | | 49.5 | 133 | * | 116.0 |
| o-4 | 0 | * | 1.4 | 61 | 0.7 | 71 | * | 0.8 | 0 | * | 0 |
| 5-14 | 20 | * | 113.1 | 464 | 2.7 | 2,186 | * | 12.6 | 17 | * | 97.9 |
| 15-24 | 52 | * | 271.9 | 5,894 | 30.6 | 25,456 | | 132.2 | 21 | * | 109.1 |
| 2544 | 129 | * | 358.7 | 10,831 | 30.2 | 22,672 | | 63.3 | 95 | * | 265.2 |
| 45-64 | 10 | * | 47.6 | 5,217 | 24.4 | 4,970 | | 23.2 | 0 | * | 0 |
| 65-74 | 3 | * | 40.9 | 2,202 | 295 | 862 | * | 11.5 | 0 | * | 0 |
| 75+ | 2 | * | 54.1 | 1,697 | 41.8 | 500 | * | 12.3 | 0 | * | 0 |
| Female | 52 | * | 42.1 | 5,190 | 4.2 | 8,411 | | 6.9 | 38 | * | 31.0 |
| 0-4 | 0 | * | 1.9 | 43 | 0.5 | 128 | * | 1.5 | 0 | * | 0 |
| 5-14 | 5 | * | 27.9 | 126 | 0.8 | 498 | * | 3 | 4 | * | 24.2 |
| 15-24 | 8 | * | 40.7 | 985 | 5 | 2,964 | * | 15.2 | 4 | * | 20.5 |
| 2544 | 36 | * | 96.1 | 2,309 | 6.2 | 3,346 | | 9 | 30 | * | 80.9 |
| 45-64 | 2 | * | 9.6 | 1,181 | 5 | 1,077 | * | 4.6 | 0 | * | 0 |
| 65-74 | 0 | * | 5.2 | 345 | 3.6 | 148 | * | 1.6 | 0 | * | 0 |
| 75+ | 0 | * | 6.0 | 201 | 2.7 | 249 | * | 3.3 | 0 | * | 0 |

* Figure has low statistical reliability or precision (relative standard error exceeds 30 percent)

** Excludes 1,030 deaths occuring in later years due to injuries incurred in 1985

## *Table* C-5

## Poisonings: Number and Rate of Injured Persons by Sex, Age, and Class of Injury, 1985

| Age and Sex | Total Number (thousands) | Total Rate per 100,000 Persons | Fatalities Number | Fatalities Rate per 100,000 Persons | Hospitalized Number | Hospitalized Rate per 100,000 Persons | Nonhospitalized Number (thousands) | Nonhospitalized Rate per 100,000 Persons |
|---|---|---|---|---|---|---|---|---|
| Total | 1,702 | 718.2 | 11,894 | 5.0 | 218,554 | 92.2 | 1,472 | 621 .0 |
| 0-4 | 339 | 1,884.3 | 93 | 0.5 | 24,986 | 138.8 | 314 | 1,744.9 |
| 5-14 | 266 * | 784.9 | 94 | 0.3 | 11,132 | 32.8 | 255 * | 751.8 |
| 15-24 | 137 * | 353.2 | 1,518 | 3.9 | 50,386 | 130.0 | 85 * | 219.3 |
| 25-44 | 547 | 749.9 | 5,942 | 8.1 | 66,942 | 91.8 | 474 | 650.0 |
| 45-64 | 256 * | 570.1 | 2,690 | 6.0 | 31,223 | 69.6 | 222 * | 494.5 |
| 65-74 | 100 * | 585.2 | 772 | 4.5 | 14,870 | 87.3 | 84* | 493.3 |
| 75+ | 58 * | 501.2 | 785 | 6.8 | 19,019 | 164.9 | 38* | 329.5 |
| Male | 688 | 600.5 | 7,621 | 6.6 | 97,754 | 85.3 | 583 | 508.6 |
| o-4 | 157 * | 1,706.9 | 52 | 0.6 | 14,121 | 153.4 | 143 * | 1553.0 |
| 5-14 | 130 * | 747.4 | 43 | 0.2 | 4,771 | 27.5 | 125 * | 719.7 |
| 15-24 | 41 * | 212.9 | 1,025 | 5.3 | 20,975 | 108.9 | 19 * | 98.7 |
| 25-44 | 220 * | 612.7 | 4,241 | 11.8 | 32,270 | 90.1 | 183 * | 510.8 |
| 45-64 | 91 * | 426.5 | 1,484 | 6.9 | 13,886 | 64.8 | 76 * | 354.8 |
| 65-74 | 43 * | 573.2 | 389 | 5.2 | 5,516 | 73.7 | 37 * | 494.3 |
| 75+ | 7 * | 162.5 | 387 | 9.5 | 6,216 | 153.0 | 0 * | 0.0 |
| Female | 1,014 | 828.3 | 4273 | 3.5 | 120,800 | 98.7 | 889 | 726.1 |
| o-4 | 182 * | 2,069.9 | 41 | 0.5 | 10,865 | 123.6 | 171 * | 1,945.8 |
| 5-14 | 136 * | 824.2 | 51 | 0.3 | 6,361 | 38.4 | 130 * | 785.4 |
| 15-24 | 96 * | 491.5 | 493 | 2.5 | 29,411 | 150.7 | 66 * | 338.3 |
| 2544 | 327 * | 882.4 | 1,701 | 4.6 | 34,672 | 93.5 | 291 * | 784.3 |
| 45-64 | 165 * | 701.2 | 1,206 | 5.1 | 17337 | 73.9 | 146 * | 622.2 |
| 65-74 | 57 * | 594.6 | 383 | 4.0 | 9354 | 98.0 | 47 * | 492.5 |
| 75+ | 51 * | 685.5 | 398 | 5.3 | 12,803 | 171.4 | 38 * | 508.8 |

* Figure has low statistical reliability or precision (relative standard error exceeds 30 percent)

## *Table C-6*

## Fire/Burns: Number and Rate of Injured Persons by Sex, Age, and Class of Injury, 1985

| Age and Sex | Total Number (thousands) | Total Rate per 100,000 Persons | Fatalities ** Number | Fatalities ** Rate per 100,000 Persons | Hospitalized Number | Hospitalized Rate per 100,000 Persons | Nonhospitalized Number (thousands) | Nonhospitalized Rate per 100,000 Persons |
|---|---|---|---|---|---|---|---|---|
| Total | 1,463 | 617.2 | 5,671 | 2.4 | 54,397 | 22.9 | 1,403 | 591.8 |
| 0-4 | 145 * | 804.1 | 811 | 4 5 | 11,885 | 66.0 | 132 * | 733.5 |
| 5-14 | 168 * | 4965 | 485 | 1.4 | 4,940 | 14.6 | 163 * | 480.6 |
| 15-24 | 370 | 955.4 | 442 | 1.1 | 8,937 | 23.1 | 361 | 931.3 |
| 25-44 | 494 | 677.8 | 1,150 | 1.6 | 16,119 | 22.1 | 477 | 654.1 |
| 45-64 | 129 * | 287.2 | 1,118 | 2.5 | 7,818 | 17.4 | 120 * | 267.3 |
| 65-74 | 106 * | 621.8 | 676 | 4.0 | 2,196 * | 12.9 | 103 * | 604.9 |
| 75+ | 50 * | 437.8 | 989 | 8.6 | 2,505 * | 21.7 | 47 * | 407.5 |
| Male | 797 | 695.6 | 3,438 | 3.0 | 38,946 | 34.0 | 755 | 658.7 |
| 0-4 | 59 * | 642.9 | 464 | 5.0 | 7,736 | 84.0 | 51 * | 553.9 |
| 5-14 | 46 * | 265.8 | 266 | 1.5 | 3,892 | 22.4 | 42 * | 241.8 |
| 1524 | 179 * | 931.9 | 290 | 1.5 | 7,142 | 37.1 | 172 * | 893.3 |
| 25-44 | 366 | 1,021.0 | 787 | 2.2 | 11,992 | 33.5 | 353 | 985.4 |
| 45-64 | 108 * | 502.5 | 756 | 3.5 | 5,896 | 27.5 | 101 * | 471.5 |
| 65-74 | 21 * | 277.7 | 387 | 5.2 | 1,399 * | 18.7 | 19 * | 253.9 |
| 75+ | 18 * | 452.2 | 488 | 12.0 | 890 * | 21.9 | 17 * | 418.3 |
| Female | 666 | 543.7 | 2,233 | 1.8 | 15,451 | 12.6 | 648 | 529.3 |
| 0-4 | 85 * | 972.9 | 347 | 3.9 | 4,149 | 47.2 | 81 * | 921.7 |
| 5-14 | 122 * | 738.7 | 219 | 1.3 | 1,048 * | 6.3 | 121 * | 731 .o |
| 15-24 | 191 * | 978.7 | 152 | 0.8 | 1,795 * | 9.2 | 189 * | 968.7 |
| 25-44 | 128 * | 346.3 | 363 | 1.0 | 4,127 | 11.1 | 124 * | 334.2 |
| 45-64 | 21 * | 90.7 | 362 | 1.5 | 1,922 * | 8.2 | 19 * | 81 .0 |
| 65-74 | 85 * | 891.7 | 289 | 3.0 | 797 * | 8.4 | 84 * | 880.3 |
| 75+ | 32 * | 430.0 | 501 | 6.7 | 1,615 * | 21.6 | 30 * | 401.7 |

* Figure has low statistical reliability or precision (relative standard error exceeds 30 percent)

** Excludes 39 deaths occuring in later years due to injuries incurred in 1985

## Table C-7

## Drownings/Near Drownings: Number and Rate of Injured Persons by Sex, Age, and Class of Injury, 1985

| Age and Sex | Total Number (thousands) | Total Rate per 100,000 Persons | Fatalities** Number | Fatalities** Rate per 100,000 Persons | Hospitalized Number | Hospitalized Rate per 100,000 Persons | Nonhospitalized Number (thousands) | Nonhospitalized Rate per 100,000 Persons |
|---|---|---|---|---|---|---|---|---|
| **Total** | 38 * | 15.9 | 6,171 | 2.6 | 5,564 | 2.3 | 26 * | 11.0 |
| 0-4 | 29 * | 159.6 | 720 | 4.0 | 1,993 * | 11.1 | 26 * | 144.5 |
| 5-14 | 1 * | 3.7 | 589 | 1.7 | 672 * | 2.0 | 0 * | 0.0 |
| 15-24 | 2 * | 5.6 | 1,461 | 3.8 | 722 * | 1.9 | 0 * | 0.0 |
| 25-44 | 3 * | 4.2 | 1,858 | 2.5 | 1,195 + | 1.6 | 0 * | 0.0 |
| 45-64 | 2 * | 3.4 | 845 | 1.9 | 678 * | 1.5 | 0 * | 0.0 |
| 65-74 | 1 * | 3.2 | 388 | 2.3 | 157 * | 0.9 | 0 * | 0.0 |
| 75+ | 0 * | 4.0 | 310 | 2.7 | 148 * | 1.3 | 0 + | 0.0 |
| **Male** | 35 * | 30.4 | 4,951 | 4.3 | 3,928 | 3.4 | 26 * | 22.7 |
| 0-4 | 28 * | 299.7 | 462 | 5.0 | 1,132 * | 12.3 | 26 * | 282.4 |
| 5-14 | 1 * | 6.1 | 458 | 2.6 | 605 * | 3.5 | 0 * | 0.0 |
| 15-24 | 2 * | 9.6 | 1,317 | 6.8 | 526 * | 2.7 | 0 * | 0.0 |
| 25-44 | 3 + | 7.2 | 1,613 | 4.5 | 967 * | 2.7 | 0 * | 0.0 |
| 45-64 | 1 * | 5.6 | 652 | 3.0 | 547 + | 2.6 | 0 * | 0.0 |
| 65-74 | 0 * | 4.0 | 254 | 3.4 | 49 * | 0.7 | 0 * | 0.0 |
| 75+ | 0 * | 7.3 | 195 | 4.8 | 103 * | 2.5 | 0 + | 0.0 |
| **Female** | 3 * | 2.3 | 1,220 | 1.0 | 1,636 * | 1.3 | 0 * | 0.0 |
| 0-4 | 1 * | 12.7 | 258 | 2.9 | 861 * | 9.8 | 0 * | 0.0 |
| 5-14 | 0 * | 1.2 | 131 | 0.8 | 67 * | 0.4 | 0 * | 0.0 |
| 15-24 | 0 * | 1.7 | 144 | 0.7 | 196 * | 1.0 | 0 + | 0.0 |
| 25-44 | 0 * | 1.3 | 245 | 0.7 | 228 * | 0.6 | 0 * | 0.0 |
| 45-64 | 0 * | 1.4 | 193 | 0.8 | 131 * | 0.6 | 0 * | 0.0 |
| 65-74 | 0 + | 2.5 | 134 | 1.4 | 108 * | 1.1 | 0 * | 0.0 |
| 75+ | 0 * | 2.1 | 115 | 1.5 | 45 * | 0.6 | 0 * | 0.0 |

* Figure has low statistical reliability or precision (relative standard error exceeds 30 percent)

** Excludes 116 deaths occuring in later years due to injuries incurred in 1985

## *Table* C-8

## Other: Number and Rate of Injured Persons by Sex, Age, and Class of Injury

| Age and Sex | Total Number (thousands) | Total Rate per 100,000 Persons | Fatalities** Number | Fatalities** Rate per 100,000 Persons | Hospitalized Number | Hospitalized Rate per 100,000 Persons | Nonhospitalized Number (thousands) | Nonhospitalized Rate per 100,000 Persons |
|---|---|---|---|---|---|---|---|---|
| Total | 35,726 | 15,070.8 | 28,487 | 12.0 | 696,707 | 293.9 | 35,001 | 14,764.9 |
| 0-4 | 2,130 | 11,835.8 | 1,308 | 7.3 | 29,576 | 164.4 | 2,099 | 11,664.l |
| 5-14 | 6,917 | 20,393.8 | 806 | 2.4 | 83,647 | 246.6 | 6,833 | 20,144.9 |
| 15-24 | 8,592 | 22,163.4 | 4,281 | 11.0 | 158,362 | 408.5 | 8,429 | 21,743.8 |
| 25-44 | 12200 | 16,729.2 | 9,288 | 12.7 | 258,758 | 354.8 | 11,932 | 16361.6 |
| 45-64 | 4,423 | 9,853.4 | 5,844 | 13.0 | 110,326 | 245.8 | 4,307 | 9,594.6 |
| 65-74 | 913 | 5363.6 | 2,750 | 16.2 | 27,536 | 161.7 | 883 | 5,185.8 |
| 75+ | 551 | 4,775.2 | 4,210 | 36.5 | 28,502 | 247.1 | 518 | 4,491.6 |
| Male | 22,288 | 19443.8 | 20,972 | 18.3 | 494,752 | 431.6 | 21,772 | 18,993.9 |
| 0-4 | 1,451 | 15,756.3 | 744 | 8.1 | 17,094 | 185.6 | 1,433 | 15,562.6 |
| 5-14 | 4332 | 24942.6 | 584 | 3.4 | 60359 | 347.5 | 4,271 | 24291.7 |
| 15-24 | 5,918 | 30,735.9 | 3,411 | 17.7 | 122,687 | 637.2 | 5,792 | 30,081 .O |
| 25-44 | 7,787 | 21,737.7 | 7,565 | 21.1 | 192,908 | 538.5 | 7,587 | 21,178.l |
| 45-64 | 2,283 | 10,655.1 | 4,585 | 21.4 | 75,067 | 350.4 | 2,203 | 10,283.3 |
| 65-74 | 326 * | 4,356.8 | 1,810 | 24.2 | 15,280 | 204.2 | 309 * | 4,128.4 |
| 75+ | 191 * | 4,690.7 | 2,273 | 56.0 | 11357 | 279.5 | 177 † | 4355.3 |
| Female | 13,438 | 10,976.5 | 7,515 | 6.1 | 201,955 | 165.0 | 13,229 | 10,805.4 |
| 0-4 | 679 | 7727.0 | 564 | 6.4 | 12,482 | 142.0 | 666 | 7278.5 |
| 5-14 | 2,586 | 15,620.8 | 222 | 1.3 | 23,288 | 140.7 | 2,562 | 15,478.8 |
| 15-24 | 2,674 | 13,702.8 | 870 | 4.5 | 35,675 | 182.8 | 2,637 | 13,515.5 |
| 25-44 | 4,413 | 11,893.l | 1,723 | 4.6 | 65,850 | 177.5 | 4,345 | 11,711 .o |
| 45-64 | 2,141 | 9,121.7 | 1,259 | 5.4 | 35,259 | 150.3 | 2,104 | 8,966.0 |
| 65-74 | 587 | 6,153.6 | 940 | 9.9 | 12,256 | 128.4 | 574 | 6,015.3 |
| 75+ | 360 | 4,821.0 | 1,937 | 25.9 | 17,145 | 229.5 | 341 | 4,565.5 |

* Figure has low statistical reliability or precision (relative standard error exceeds 30 percent)
†+ Excludes 1,853 deaths occuring in later years due to injuries incurred in 1985

## *Table* C-9

### Motor Vehicles: Lifetime Cost* of Injury by Age, Sex, and Type of Cost, 1985

| Age and Sex | Amount (millions) | | | | Per Injured Person | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Indirect cost | | | | Indirect Cost | |
| | Total | Direct | Morbidity | Mortality | Total | Direct | Morbidity | Mortality** |
| Total | $48,683 | $12,270 | $19,085 | $17,328 | $9,062 | $2,304 | $3,583 | $330,843 |
| 0-4 | 1,004 | 207 | 539 | 258 | 8,963 | 1,869 | 4,864 | 215,084 |
| 5-14 | 3,107 | 817 | 1,553 | 737 | 9,485 | 2,512 | 4,775 | 264,858 |
| 15-24 | 16,107 | 3,890 | 5,259 | 6,957 | 9,135 | 2,224 | 3,007 | 401,696 |
| 25-44 | 20,652 | 4,370 | 8,620 | 7,662 | 10,005 | 2,132 | 4,206 | 444,497 |
| 45-64 | 5,939 | 1,828 | 2,534 | 1,577 | 7,485 | 2,325 | 3,222 | 211,640 |
| 65+ | 1,874 | 1,158 | 579 | 137 | 6,017 | 3,793 | 1,898 | 21,429 |
| Male | 33,328 | 6,765 | 12,912 | 13,652 | 13,554 | 2,788 | 5,321 | 370,618 |
| 0-4 | 628 | 124 | 342 | 162 | 8,993 | 1,798 | 4,945 | 232,365 |
| 5-14 | 2,145 | 511 | 1,131 | 503 | 11,336 | 2,724 | 6,025 | 288,666 |
| 15-24 | 11,379 | 2,243 | 3,639 | 5,497 | 14,912 | 2,981 | 4,836 | 426,407 |
| 2544 | 14,987 | 2,625 | 6,106 | 6,256 | 14,472 | 2,563 | 5,962 | 488,672 |
| 45-64 | 3,511 | 799 | 1,537 | 1,175 | 13,801 | 3,199 | 6,157 | 230,665 |
| 65+ | 679 | 463 | 157 | 60 | 4,622 | 3,226 | 1,093 | 16,488 |
| Female | 15,355 | 5,506 | 6,173 | 3,676 | 5,271 | 1,899 | 2,129 | 236,553 |
| 0-4 | 377 | 83 | 198 | 96 | 8,913 | 1,987 | 4,730 | 191,172 |
| 5-14 | 962 | 306 | 422 | 234 | 6,952 | 2,222 | 3,068 | 225,039 |
| 15-24 | 4,728 | 1,647 | 1,620 | 1,460 | 4,727 | 1,653 | 1,626 | 329,752 |
| 25-44 | 5,665 | 1,745 | 2,514 | 1,406 | 5,507 | 1,703 | 2,453 | 316,971 |
| 45-64 | 2,429 | 1,030 | 997 | 402 | 4,505 | 1,918 | 1,856 | 170,558 |
| 65+ | 1,195 | 695 | 423 | 77 | 7,263 | 4,295 | 2,611 | 27,864 |

* Discounted at 6 percent

** Based on 52,375 deaths, including 6,452 deaths occuring in later years due to injuries sustained in 1985

## *Table C-10*

## Falls: Lifetime Cost* of Injury by Age, Sex, and Type of Cost, 1985

| Age and Sex | Amount (millions) | | | | Per Injured Person | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Indirect Cost | | | | Indirect Cost | |
| | Total | Direct | Morbidity | Mortality | Total | Direct | Morbidity | Mortality** |
| **Total** | $37,279 | $14,689 | $21,049 | $1,541 | $3,033 | $1,197 | **$1,715** | $93,554 |
| 0-4 | 1,161 | 612 | 520 | 28 | 882 | 465 | 395 | 192,473 |
| 5-14 | 2,626 | 1,042 | 1,556 | 29 | 1,057 | 420 | 626 | 165,944 |
| 15-24 | 6,456 | 1,006 | 5,170 | 280 | 3,538 | 551 | 2,834 | 235,831 |
| 25-44 | 10,994 | 2,019 | 8,259 | 716 | 4,244 | 780 | 3,190 | 342,264 |
| 45-64 | 6,243 | 2,288 | 3,573 | 383 | 3,558 | 1,305 | 2,038 | 131,459 |
| 65+ | 9,799 | 7,722 | 1,972 | 105 | 4,226 | 3343 | 854 | 10,547 |
| **Male** | 21,041 | 5,445 | 14,335 | 1,261 | 3,735 | 968 | 2,548 | 138,042 |
| 0-4 | 690 | 341 | 328 | 21 | 996 | 493 | 474 | 226,150 |
| 5-14 | 1,820 | 632 | 1,165 | 24 | 1,437 | 499 | 920 | 152,833 |
| 15-24 | 4,792 | 661 | 3,881 | 250 | 4,476 | 618 | 3,626 | 248,858 |
| 25-44 | 8,224 | 1,265 | 6,332 | 627 | 5,852 | 901 | 4,510 | 371,720 |
| 45-64 | 3,539 | 1,003 | 2,237 | 298 | 4,943 | 1,403 | 3,131 | 153,627 |
| 65+ | 1,976 | 1,543 | 391 | 42 | 4,096 | 3,225 | 817 | 9,800 |
| **Female** | 16,239 | 9,245 | 6,714 | 280 | 2,440 | 1,390 | 1,010 | 38,136 |
| 0-4 | 471 | 271 | 192 | 8 | 755 | 435 | 308 | 137,748 |
| 5-14 | 806 | 411 | 390 | 5 | 662 | 337 | 321 | 278,119 |
| 15-24 | 1,663 | 344 | 1,289 | 30 | 2,205 | 456 | 1,709 | 164,677 |
| 2544 | 2,770 | 755 | 1,927 | 89 | 2,337 | 637 | 1,626 | 220,582 |
| 45-64 | 2,705 | 1,285 | 1,335 | 84 | 2,603 | 1,237 | 1,286 | 87,053 |
| 65+ | 7,823 | 6,178 | 1,581 | 63 | 4,260 | 3,373 | 863 | 11,105 |

* Discounted at 6 percent

** Based on 16,470 deaths, including 3,604 deaths occuring in later years due to injuries sustained in 1985

Table C-11

## Firearms: Lifetime Cost* of Injury by Age, Sex, and Type of Cost, 1985

| Age and Sex | Amount (millions) | | | | Per Injured Person | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Indirect costs | | | | Indirect costs | |
| | Total | Direct | Morbidity | Mortality | Total | Direct | Morbidity | Mortality** |
| **Total** | **$14,410** | $911 | **$1,418** | $12,080 | **$53,831** | $3,860 | **$6,006** | **$370,706** |
| 0-4 | 33 | 2 | 8 | 23 | 108,386 | 11,566 | 39,586 | 217,900 |
| 5-14 | 293 | 38 | 48 | 207 | 12,087 | 1,606 | 2,039 | 268,924 |
| 15-24 | 4,204 | 365 | 394 | 3,445 | 69,720 | 6,834 | 7,372 | 468,860 |
| 2544 | 7,838 | 379 | 677 | 6,782 | 47,746 | 2,510 | 4,483 | 504,781 |
| 45-64 | 1,848 | 90 | 228 | 1,530 | 148,516 | 14,891 | 37,769 | 237,665 |
| 65+ | 193 | 37 | 63 | 93 | 31,123 | 20,940 | 35,767 | 20,779 |
| Male | 12,328 | 784 | 1,054 | 10,491 | 57,053 | 4,132 | 5,554 | 384,424 |
| 0-4 | 20 | 1 | 4 | 14 | 148,146 | 10,541 | 62,799 | 235,216 |
| 5-14 | 241 | 32 | 38 | 171 | 12,242 | 1,674 | 1,960 | 265,249 |
| 15-24 | 3,669 | 320 | 308 | 3,041 | 70,078 | 6,896 | 6,620 | 484,188 |
| 25-44 | 6,740 | 326 | 523 | 5,890 | 52,450 | 2,774 | 4,448 | 530,351 |
| 45-64 | 1,535 | 74 | 160 | 1,301 | 150,637 | 14,858 | 32,220 | 247,444 |
| 65+ | 125 | 30 | 21 | 74 | 23,732 | 22‘258 | 15,122 | 18,739 |
| Female | 2,081 | 128 | 365 | 1,589 | 40,338 | 2,749 | 7,855 | 300,035 |
| 0-4 | 13 | 2 | 3 | 8 | 77,694 | 12,135 | 26,711 | 193,337 |
| 5-14 | 53 | 6 | 11 | 36 | 11,430 | 1,313 | 2,377 | 287,707 |
| 15-24 | 535 | 45 | 86 | 404 | 67,363 | 6,418 | 12,390 | 378,732 |
| 2544 | 1,098 | 53 | 154 | 892 | 30,791 | 1,580 | 4,606 | 382,152 |
| 45-64 | 314 | 16 | 68 | 229 | 138,946 | 15,047 | 63,374 | 194,140 |
| 65+ | 68 | 7 | 42 | 19 | 72,358 | 16,421 | 106,595 | 35,524 |

* Discounted at 6 percent

** Based on 32,586 deaths, including 1,030 deaths occuring in later years due to injuries sustained in 1985

## Table C-12

## Poisonings: Lifetime Cost *of Injury by Age, Sex, and Type of Cost, 1985

| Age and Sex | Amount (millions) | | | | Per Injured Person | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Indirect Cost | | | | Indirect Cost | |
| | Total | Direct | Morbidity | Mortality | Total | Direct | Morbidity | Mortality** |
| Total | $8,537 | $1,703 | $2,441 | $4,394 | $5,015 | $1,007 | $1,444 | $369,402 |
| 0-4 | 168 | 148 | 0 | 20 | 495 | 437 | 0 | 212,671 |
| 5-14 | 108 | 77 | 0 | 30 | 405 | 291 | 0 | 321,663 |
| 15-24 | 1,484 | 321 | 429 | 734 | 10,839 | 2,370 | 3,167 | 483,760 |
| 25-44 | 4,761 | 510 | 1,299 | 2,952 | 8,706 | 943 | 2,401 | 496,835 |
| 45-64 | 1,429 | 272 | 536 | 621 | 5,582 | 1,072 | 2,116 | 230,877 |
| 65+ | 588 | 374 | 177 | 36 | 3,734 | 2,402 | 1,138 | 23,154 |
| Male | 5589 | 726 | 1,599 | 3,265 | 8,119 | 1,066 | 2349 | 428,358 |
| 0-4 | 96 | 83 | 0 | 12 | 608 | 531 | 0 | 232,417 |
| 5-14 | 52 | 36 | 0 | 15 | 398 | 281 | 1 | 352,238 |
| 15-24 | 942 | 133 | 277 | 532 | 22,973 | 3,329 | 6,927 | 518,891 |
| 25-44 | 3,452 | 246 | 900 | 2,306 | 15,728 | 1,144 | 4,182 | 543,726 |
| 45-64 | 870 | 119 | 365 | 386 | 9,523 | 1,328 | 4,059 | 260,066 |
| 65+ | 177 | 107 | 57 | 14 | 3,583 | 2,200 | 1,162 | 17,450 |
| Female | 2,948 | 977 | 842 | 1,129 | 2,907 | 968 | 834 | 264,252 |
| 0-4 | 72 | 65 | 0 | 8 | 398 | 356 | 0 | 187,626 |
| 5-14 | 56 | 41 | 0 | 15 | 411 | 301 | 0 | 295,885 |
| 15-24 | 542 | 188 | 152 | 202 | 5,652 | 1,968 | 1,591 | 410,720 |
| 25-44 | 1,309 | 264 | 399 | 646 | 3,998 | 811 | 1,224 | 379,924 |
| 45-64 | 558 | 152 | 171 | 235 | 3,394 | 932 | 1,047 | 194,959 |
| 65+ | 411 | 267 | 121 | 23 | 3,804 | 2,494 | 1,127 | 28,821 |

* Discounted at 6 percent
** Based on 11,894 deaths

## Table C-13

### Fires/Burns: Lifetime Cost* of Injury by Age, Sex, and Type of Cost, 1985

| Age and Sex | Cost* (millions) | | | | Cost per Injured Person | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Indirect | | | | Indirect | |
| | Total | Direct | Morbidity | Mortality | Total | Direct | Morbidity | Mortality** |
| Total | $3,832 | $920 | $1,548 | $1,364 | $2,619 | $631 | $1,062 | $238,841 |
| 0-4 | 326 | 137 | 14 | 175 | 2,253 | 953 | 100 | 215,188 |
| 5-14 | 267 | 80 | 42 | 144 | 1,583 | 478 | 252 | 296,928 |
| 15-24 | 785 | 155 | 417 | 212 | 2,118 | 420 | 1,128 | 479,831 |
| 25-44 | 1,607 | 301 | 743 | 563 | 3,252 | 610 | 1,507 | 489,644 |
| 45-64 | 642 | 118 | 286 | 238 | 4,977 | 921 | 2,238 | 205,653 |
| 65+ | 205 | 129 | 44 | 32 | 1,313 | 832 | 288 | 19,302 |
| Male | 2,801 | 608 | 1,237 | 955 | 3,513 | 766 | 1,559 | 274,804 |
| 0-4 | 188 | 77 | 3 | 108 | 3,173 | 1,316 | 50 | 231,852 |
| 5-14 | 176 | 49 | 42 | 86 | 3,816 | 1,062 | 912 | 321,624 |
| 15-24 | 630 | 114 | 366 | 150 | 3,509 | 638 | 2,041 | 516,360 |
| 25-44 | 1,233 | 227 | 582 | 424 | 3,371 | 622 | 1,594 | 539,050 |
| 45-64 | 489 | 86 | 228 | 174 | 4,541 | 806 | 2,134 | 219,468 |
| 65+ | 86 | 55 | 17 | 14 | 2,187 | 1,427 | 446 | 15,895 |
| Female | 1,030 | 312 | 310 | 408 | 1,548 | 470 | 468 | 182,844 |
| o-4 | 138 | 60 | 11 | 67 | 1,615 | 702 | 134 | 192,905 |
| 5-14 | 91 | 32 | 0 | 58 | 741 | 259 | 4 | 266,932 |
| 15-24 | 155 | 41 | 52 | 62 | 811 | 214 | 271 | 410,137 |
| 25-44 | 374 | 74 | 161 | 139 | 2,914 | 579 | 1,260 | 382,530 |
| 45-64 | 153 | 32 | 58 | 63 | 7,182 | 1,506 | 2,766 | 175,315 |
| 65+ | 120 | 74 | 27 | 18 | 1,021 | 636 | 235 | 23,076 |

* Discounted at 6 percent

** Based on 5,710 deaths, including 39 deaths occuring in later years due to injuries sustained in 1985

## Table C-14

### Drownings/Near Drownings: Lifetime Cost* of Injury by Age, Sex, and Type of Cost, 1985

| Age and Sex | Cost" (millions) | | | | Cost per Injured Person | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Indirect | | | | Indirect | |
| | Total | Direct | Morbidity | Mortality | Total | Direct | Morbidity | Mortality** |
| Total | $2,453 | $78 | $107 | $2,268 | $64,993 | $2,466 | $3,339 | $360,707 |
| 0-4 | 183 | 26 | 0 | 157 | 6,376 | 917 | 6 | 218,365 |
| 5-14 | 201 | 8 | 2 | 190 | 159,021 | 11,270 | 3,720 | 323,347 |
| 15-24 | 767 | 11 | 28 | 728 | 351,406 | 15,023 | 38,738 | 498,496 |
| 25-44 | 1,039 | 17 | 48 | 974 | 340,247 | 14,344 | 39,999 | 524,131 |
| 45-64 | 236 | 12 | 23 | 202 | 155,285 | 17,200 | 34,058 | 209,934 |
| 65+ | 27 | 5 | 5 | 16 | 26,516 | 16,205 | 17,851 | 23,221 |
| Male | 2,117 | 56 | 76 | 1,986 | 60,704 | 1,873 | 2,526 | 391,884 |
| o-4 | 122 | 15 | 0 | 108 | 4,434 | 539 | 6 | 232,785 |
| 5-14 | 163 | 7 | 2 | 155 | 153,160 | 11,115 | 2,584 | 337,383 |
| 15-24 | 700 | 8 | 22 | 670 | 379,937 | 15,570 | 41,662 | 508,823 |
| 25-44 | 928 | 14 | 35 | 879 | 359,571 | 14,753 | 35,745 | 544,861 |
| 45-64 | 191 | 10 | 16 | 166 | 159,460 | 17,738 | 28,614 | 215,934 |
| 65+ | 13 | 3 | 2 | 9 | 21,788 | 16,834 | 11,479 | 19,579 |
| Female | 335 | 22 | 31 | 282 | 117,372 | 13,302 | 19,171 | 231,221 |
| 0-4 | 61 | 11 | 0 | 50 | 54,257 | 12,820 | 0 | 192,542 |
| 5-14 | 38 | 1 | 1 | 36 | 190,483 | 12,674 | 13,975 | 274,276 |
| 15-24 | 67 | 3 | 6 | 58 | 196,748 | 13,557 | 30,892 | 404,045 |
| 25-44 | 111 | 3 | 13 | 95 | 234,848 | 12,611 | 58,042 | 387,650 |
| 45-64 | 45 | 2 | 7 | 36 | 139,839 | 14,952 | 56,790 | 186,060 |
| 65+ | 14 | 2 | 4 | 7 | 33,584 | 15,580 | 24,182 | 29,788 |

* Discounted at 6 percent

** Based on 6,287 deaths, including 116 deaths occuring in later years due to injuries sustained in 1985

## *Table C-15*

### Other: Lifetime Cost* of Injury by Age, Sex, and Type of Cost, 1985

| Age and Sex | Cost* (millions) | | | | Cost per Injured Person | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Indirect | | | | Indirect | |
| | Total | Direct | Morbidity | Mortality | Total | Direct | Morbidity | Mortality** |
| Total | $42,421 | $14,235 | $19,272 | $8,914 | $1,187 | $399 | $540 | $293,817 |
| 0 4 | 1,252 | 677 | 303 | 273 | 588 | 318 | 142 | 200,418 |
| 5-14 | 3,097 | 1,964 | 865 | 268 | 448 | 284 | 125 | 243,540 |
| 15-24 | 9,340 | 3,187 | 4,028 | 2,125 | 1,087 | 371 | 469 | 460,224 |
| 25-44 | 18,931 | 5,127 | 9,034 | 4,770 | 1,552 | 421 | 741 | 483,403 |
| 45-64 | 7,634 | 2,149 | 4,131 | 1,353 | 1,726 | 487 | 935 | 216,622 |
| 65+ | 2,167 | 1,131 | 910 | 126 | 1,480 | 776 | 625 | 17,602 |
| Male | 30,790 | 9,524 | 13,831 | 7,435 | 1,381 | 428 | 621 | 331,363 |
| 0 4 | 788 | 432 | 188 | 168 | 543 | 298 | 130 | 212,363 |
| 5-14 | 2,178 | 1,329 | 645 | 204 | 503 | 307 | 149 | 300,406 |
| 15-24 | 7,025 | 2,313 | 2,944 | 1,768 | 1,187 | 391 | 498 | 478,829 |
| 25-44 | 14,744 | 3,707 | 6,932 | 4,105 | 1,893 | 476 | 891 | 507,116 |
| 45-64 | 5,294 | 1,318 | 2,853 | 1,123 | 2,319 | 578 | 1,252 | 228,878 |
| 65+ | 761 | 426 | 269 | 66 | 1,473 | 831 | 524 | 15,551 |
| Female | 11,631 | 4,711 | 5,441 | 1,479 | 866 | 351 | 405 | 187,187 |
| 0 4 | 464 | 245 | 115 | 104 | 683 | 361 | 169 | 183,764 |
| 5-14 | 919 | 635 | 220 | 64 | 355 | 246 | 85 | 151,472 |
| 15-24 | 2,315 | 874 | 1,084 | 357 | 866 | 327 | 406 | 385,946 |
| 25-44 | 4,187 | 1,420 | 2,102 | 665 | 949 | 322 | 476 | 375,074 |
| 45-64 | 2,340 | 832 | 1,278 | 230 | 1,093 | 389 | 598 | 171,707 |
| 65+ | 1,406 | 705 | 642 | 59 | 1,484 | 747 | 679 | 20,647 |

* Discounted at 6 percent

** Based on 30,343 deaths, including 1,853 deaths occuring in later years due to injuries sustained in 1985

## Table C-16

## Mortality, Including Deaths in Later Years, by Age, Sex, and Cause of Injury, 1985

| Age and Sex | Total | Motor Vehicles | Falls | Fire-arms | Poison-ings | Fires / Burns | Drown-ings* | Other |
|---|---|---|---|---|---|---|---|---|
| Total | 155,665 | 52,375 | 16,470 | 32,586 | 11,894 | 5,710 | 6,287 | 30,343 |
| 0-4 | 4,434 | 1,199 | 147 | 104 | 93 | 811 | 720 | 1,360 |
| 5-14 | 5,992 | 2,782 | 172 | 770 | 94 | 485 | 589 | 1,100 |
| 15-24 | 33,896 | 17,320 | 1,189 | 7,348 | 1,518 | 442 | 1,461 | 4,618 |
| 25-44 | 51,279 | 17,238 | 2,089 | 13,435 | 5,942 | 1,150 | 1,858 | 9,867 |
| 45-64 | 27,854 | 7,450 | 2,913 | 6,437 | 2,690 | 1,157 | 961 | 6,246 |
| 65+ | 31,910 | 6,386 | 9,960 | 4,492 | 1,557 | 1,665 | 698 | 7,152 |
| Male | 111,867 | 36,836 | 9,136 | 27,289 | 7,621 | 3,477 | 5,067 | 22,441 |
| 0-4 | 2,618 | 696 | 91 | 61 | 52 | 464 | 462 | 792 |
| 5-14 | 3,986 | 1,741 | 154 | 644 | 43 | 266 | 458 | 680 |
| 15-24 | 26,502 | 12,892 | 1,005 | 6,280 | 1,025 | 290 | 1,317 | 3,693 |
| 25-44 | 40,327 | 12,803 | 1,686 | 11,102 | 4,241 | 787 | 1,613 | 8,095 |
| 45-64 | 20,245 | 5,092 | 1,943 | 5,256 | 1,484 | 795 | 768 | 4,907 |
| 65+ | 18,189 | 3,612 | 4,257 | 3,946 | 776 | 875 | 449 | 4,274 |
| Female | 43,798 | 15,539 | 7,334 | 5,297 | 4,273 | 2,233 | 1,220 | 7,902 |
| 0-4 | 1,816 | 503 | 56 | 43 | 41 | 347 | 258 | 568 |
| 5-14 | 2,006 | 1,041 | 18 | 126 | 51 | 219 | 131 | 420 |
| 15-24 | 7,394 | 4,428 | 184 | 1,068 | 493 | 152 | 144 | 925 |
| 25-44 | 11,252 | 4,435 | 403 | 2,333 | 1,701 | 363 | 245 | 1,772 |
| 45-64 | 7,609 | 2,358 | 970 | 1,181 | 1,206 | 362 | 193 | 1,339 |
| 65+ | 13,721 | 2,774 | 5,703 | 546 | 781 | 790 | 249 | 2,878 |

* Includes Near Drownings

***Table C-17***

**Life Expectancy in Years, by Age and Sex, 1985**

| Age | Total | Male | Female |
|---|---|---|---|
| Under 1 | 74.6 | 71.2 | 78.1 |
| 1 4 | 73.1 | 69.7 | 76.5 |
| 5-9 | 68.7 | 65.3 | 72.1 |
| 10-14 | 63.8 | 60.3 | 67.2 |
| 15-19 | 58.9 | 55.5 | 62.3 |
| 20-24 | 54.2 | 50.9 | 57.4 |
| 25-29 | 49.5 | 46.3 | 52.6 |
| 30-34 | 44.8 | 41.7 | 47.7 |
| 35-39 | 40.1 | 37.1 | 42.9 |
| 4044 | 35.5 | 32.5 | 38.2 |
| 4549 | 31.0 | 28.1 | 33.6 |
| 50-54 | 26.6 | 23.9 | 29.1 |
| 55-59 | 22.6 | 20.1 | 24.9 |
| 60-64 | 18.8 | 16.5 | 20.8 |
| 65-69 | 15.4 | 13.3 | 17.1 |
| 70-74 | 12.3 | 10.5 | 13.6 |
| 75-79 | 9 5 | 8.1 | 10.5 |
| 80-84 | 7.2 | 6.1 | 7.8 |
| 85+ | 6.0 | 5.1 | 6.4 |

Source: National Center for Health Statistics: Vital Statistics of the United States, 1985, Vol. II, Sec. 6, Life Tables. DHSS Pub. No. (PHS) 88-1104. Public Health Service, Washington. U.S. Government Printing Office, 1988

Table C-18

**Present Value of Lifetime Earnings by Age, Sex, and Discount Rate, 1985**

| Age | Males | | Females | |
|---|---|---|---|---|
| | 4 Percent | 6 Percent | 4 Percent | 6 Percent |
| Under 1 | 421,235 | 208,631 | 341,274 | 173,738 |
| 1-4 | 454,561 | 236,117 | 368,388 | 196,515 |
| 5-9 | 519,459 | 293,977 | 420,790 | 244,559 |
| 10-14 | 602,092 | 374,790 | 487,557 | 311,678 |
| 15-19 | 689,576 | 468,782 | 552,141 | 384,026 |
| 20-24 | 745,680 | 541,021 | 578,481 | 425,804 |
| 25-29 | 749,695 | 568,546 | 558,019 | 424,982 |
| 30-34 | 717,630 | 565,043 | 513,796 | 402,176 |
| 35-39 | 653,498 | 532,289 | 454,897 | 364,873 |
| 40-44 | 561,016 | 471,190 | 388,555 | 319,090 |
| 45-49 | 450,452 | 389,462 | 319,279 | 268,529 |
| 50-54 | 331,478 | 294,646 | 249,422 | 214,826 |
| 55-59 | 213,719 | 194,878 | 181,151 | 159,614 |
| 60-64 | 108,880 | 101,085 | 117,333 | 105,272 |
| 65-69 | 42,879 | 39,713 | 67,346 | 61,103 |
| 70-74 | 19,176 | 17,802 | 36,593 | 33,574 |
| 75-79 | 9,383 | 8,789 | 18,847 | 17,531 |
| 80-84 | 4,698 | 4,457 | 9,164 | 8,655 |
| 85+ | 1,442 | 1,408 | 2,311 | 2,257 |

## *Table* C-19

## Selected Economic Variables Used in Estimating Mortality Cost by Age and Sex, 1985

| Age | Percent of Population with Earnings | | Mean Annual Earnings* In Labor Force | | Mean Annual Value of Housekeeping Services** In Labor Force | | Not in Labor Force | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female |
| 15-19 | 44.9 | 41.5 | $6,706 | $6,353 | $1,835 | $4,691 | $3,611 | $9,330 |
| 20-24 | 85.0 | 71.8 | 19357 | 16,030 | 2,220 | 7,076 | 4,706 | 11,715 |
| 25-29 | 94.1 | 75.5 | 25,771 | 19,702 | 2,604 | 7,862 | 5,091 | 123% |
| 30-34 | 94.4 | 74.1 | 30,950 | 22,268 | 2,871 | 8,491 | 5,327 | 13,130 |
| 3539 | 94.8 | 75.6 | 36,075 | 22,077 | 2,960 | 8,911 | 5,446 | 13,549 |
| 40-44 | 935 | 75.4 | 38,856 | 21,642 | 2,989 | 8,202 | 5,475 | 12,920 |
| 45-49 | 932 | 73.0 | 38,884 | 21,252 | 2,989 | 7,469 | 5,475 | 12,108 |
| 50-54 | 905 | 65.4 | 37,497 | 20,476 | 2,989 | 7,469 | 5,475 | 12,108 |
| 55-59 | 82.0 | 55.7 | 35,936 | 19,878 | 3,196 | 7,338 | 5,682 | 12,029 |
| 60-64 | 62.6 | 40.3 | 35,409 | 19,270 | 3,196 | 7,338 | 5,682 | 12,029 |
| 6569 | 24.6 | 13.3 | 33,412 | 19,552 | 3,196 | 7,155 | 5,712 | 11,793 |
| 70-74 | 12.9 | 5.5 | 27,898 | 16,529 | 2,276 | 5,094 | 4,067 | 8,397 |
| 75-79 | a.4 | 3.0 | 23,284 | 13,988 | 1,547 | 3,464 | 2,766 | 5,710 |
| 80-84 | 5.5 | 1.5 | 19,418 | 11,824 | 899 | 2,013 | 1,607 | 3317 |
| 85+ | 3.5 | 1.0 | 16,212 | 9,999 | 509 | 1,139 | 909 | 1,878 |

* Mean annual earnings for year-round full-time workers, including supplements, consisting mainly of employer's contributions to social insurance

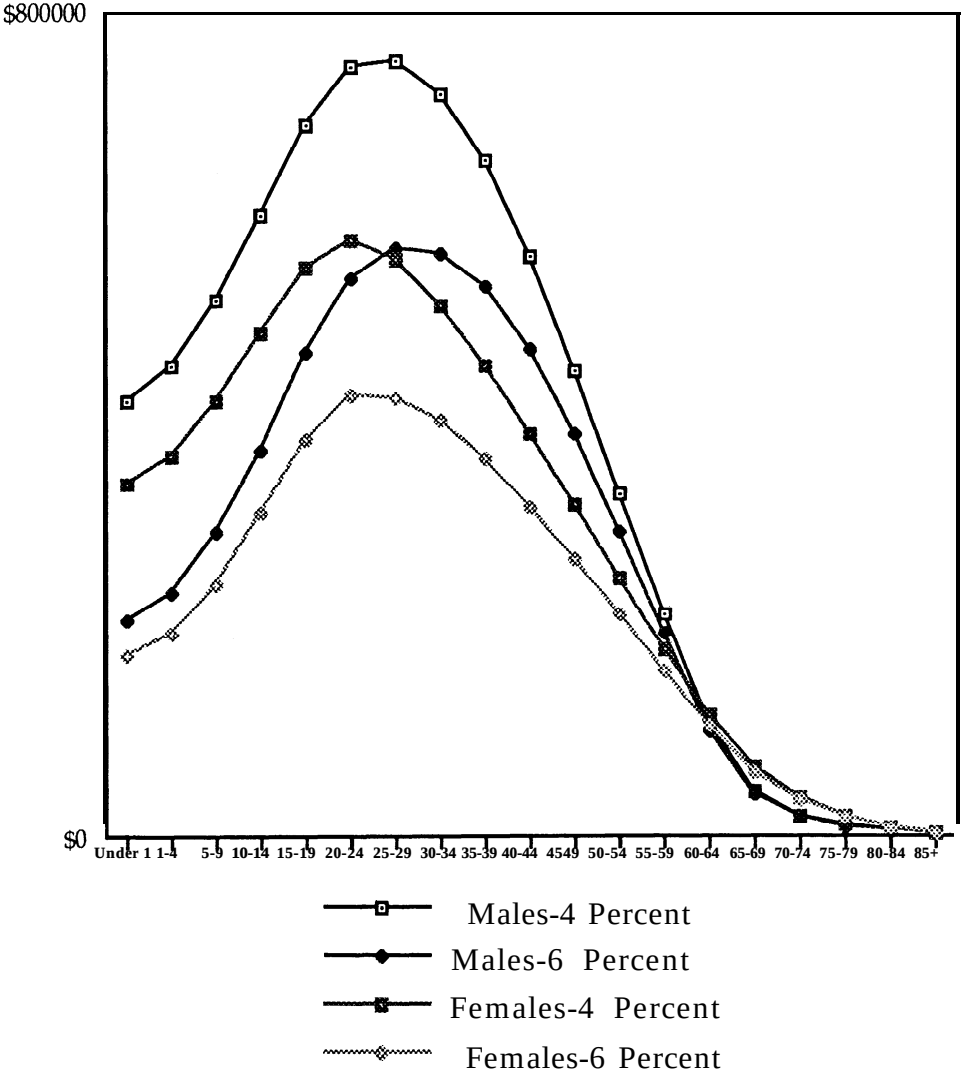
** Values are imputed by multiplying hours spent in each type of domestic activity by the wages for corresponding occupations

Source: U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 156, "Money Income of Households, Families, and Persons in the United States, 1985." Tables 34 and 36. U.S. Government Printing Office, Washington, D.C.

U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, January 1986, Table 3

***Figure C-1***

**Present Value of Lifetime Earnings, by Age, Sex, and Discount Rate, 1985**



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# *Glossary*

## Government Agencies and Programs

Centers for Disease Control (CDC)
Consumer Product Safety Commission (CPSC)
Department of Health and Human Services (DHHS)
Department of Transportation (DOT)
National Center for Health Statistics (NCHS)
National Highway Traffic Safety Administration (NHTSA)
National Institutes of Health (NIH)
Old Age Survivor Disability Insurance (OASDI)
Social Security Administration (SSA)
Social Security Income (SSI)
Veterans Administration (VA)
Workers' Compensation (WC)

## Sources of Data

***Annual Survey on Occupational Injuries.*** An annual survey of establishments in the private sector conducted by the Bureau of Labor Statistics to collect statistics on occupational injuries and illnesses. A sample of approximately 280,000 establishments is selected from 5 million establishments with 11 or more employees. Information is provided on all work-related fatalities and illnesses and occupational injuries that involve loss of consciousness, restriction of work or motion, transfer to another job, or medical treatment beyond first aid. Data are reported by industry on lost or restricted workdays, nonfatal cases that do not involve lost workdays, days away from work, and fatalities by cause.

***Fatal Accident Reporting System (FARS).*** Data from traffic fatalities are collected from police reports, hospitals, medical examiners and coroners, Emergency Medical Services reports, state registration, driver licensing, highway department files, and death certificates. **FARS** is administered by the National Highway Traffic Safety Administration. Data are collected on time and location of the accident, age and sex of each person involved, alcohol involvement, and injury severity.

***National Accident Surveillance System (NASS).*** A national random sample of police reports of motor vehicle crashes administered by the National Highway Traffic Safety Administration.

***National Council on Compensation Insurance (NCCI).*** **A** random sample of nearly 500,000 Workers' Compensation cases in 16 states including detailed information on nature of injury, cost per case, and lost workdays. Claims have been tracked since 1979, and payments are reported at six months and every twelve months thereafter.

***National Electronic Injury Surveillance System (NEISS).*** Data on patients sustaining injuries associated with consumer products collected from a national random sample of hospital emergency departments, administered by the Consumer Product Safety Commission.

***National Health Interview Survey (NHIS).*** A continuing nationwide sample survey in which data on health status, acute and chronic conditions, and medical care use are collected through personal household interviews, administered by the National Center for Health Statistics. About 50,000 households with 125,000 persons are interviewed annually. In addition to a core set of questions repeated each year, supplement questionnaires on current health topics change each year in response to the need for data on special topics.

***National Hospital Discharge Survey (NHDS).*** A continuing nationwide sample survey of about 500 short-stay hospitals, administered by the National Center for Health Statistics. Within each sample hospital, a systematic random sample of discharges is selected and data are abstracted from about 200,000 medical records. Data are collected on admissions, length of stay, diagnoses, and procedures.

***National Medical Care Utilization & Expenditure Survey (NMCUES)*** A nationwide sample survey conducted in 1980 by the National Center for Health Statistics in which 10,000 households encompassing 17,000 individuals were interviewed five times at approximately 3-month intervals. Data were collected on health conditions, services, charges, sources and amounts of payments.

***National Mortality Detail File (NMDF).*** Data from death certificates for all residents who die in the United States each year, administered by the National Center for Health Statistics. Included are demographic characteristics of the decedent and cause of death.

***National Nursing Home Survey (NNHS).*** A periodic sample survey of nursing homes, administered by the National Center for Health Statistics. The 1985 survey data were obtained on the medical conditions and expenses of 6,023 discharges and 5,243 residents in 1,079 facilities.

***Survey of Income and Program Participation (SIPP).*** A nationwide sample survey conducted by the Bureau of the Census that began in 1983. The sample includes approximately 21,000 households interviewed every ***4*** months for 2 and 2/3 years. Each February a new panel of households goes into the field and members of each panel go through interviews or waves. Data are collected on demographics, housing, income and wealth, health status, and health expenses.

## Economic Terms

***Cost-of-illness studies.*** Studies that quantify the cost associated with a particular illness, based on either the prevalence or incidence of the illness. Most studies attempt to measure both direct and indirect costs.

***Currently employed.*** A term used in the NHIS to characterize persons 18 years of age and over who reported that at any time during the 2-week period covered by the interview they either worked or had a job or business.

***Direct cost.*** The actual dollar expenditures related to illness or injury, including amounts spent for hospital and nursing home care, physician and other medical professional services, drugs and appliances, and rehabilitation.

***Discount rate.*** A rate used to convert a future stream of dollars into the present value equivalent. The higher the discount rate, the lower the present value of a given stream of dollars.

***Human capital.*** An approach to valuing life in which productivity is based on market earnings and an imputed value for housekeeping services.

***Indirect cost.*** The value of lost output due to the reduced productivity caused by illness, disability, or injury. This includes the value of lost workdays and housekeeping days due to illness and disability, and losses due to premature death.

***Labor force participation rate.*** The proportion or percent of the population employed at a given point in time.

***Later year cost.*** The cost in later years associated with injuries sustained in 1985.

**Life *expectancy.*** The average number of years of life remaining to a person at a particular age based on a given set of age- and sex-specific death rates.

Life ***years lost.*** The number of years that an individual would have been productive in the absence of injury or impairment, based on the number of years of life expectancy remaining at the age of death.

***Lifetime cost.*** The present discounted value of costs occurring in all future years.

***Lifetime earnings.*** The present discounted value of earnings in future years for the remainder of an individual's life.

***Market earnings.*** Wages and salaries earned in the labor market including supplements such as employer's contributions to social insurance.

***Morbidity cost.*** The value of lost productivity by individuals unable to perform their usual activities due to injury or disability, or those who cannot perform at a level of full effectiveness.

***Mortality cost.*** The value of lost productivity due to premature death resulting from injury. This is calculated as the present discounted value of future market earnings plus an imputed value for housekeeping services.

***Productivity loss.*** The value of output not produced due to injury or disability.

***Restriction of activity.*** A term used in the NHIS for categorizing limitations resulting from injury which encompasses four types of restriction: bed days, work-loss days, school-loss days, and cut-down days.

***Transfer payment.*** A payment that represents a transfer of funds from one payer to another and does not represent new goods or services produced. Insurance settlements, for example, are funds transferred from the insurance company to the hospital or individual to pay for medical services that have already been counted elsewhere.

***Value of housekeeping services.*** An imputed value calculated by assigning the prevailing wage rate for performance of tasks similar to those performed by housekeepers. For example, time spent cooking might be valued using the prevailing wage rate for a cook.

***Willingness to pay.*** An approach to valuing human life based on what an individual would be willing to pay for a change that reduces the probability of illness or death. It encompasses both the direct and indirect cost of illness.

Work-loss ***day.*** A term used in the NHIS for a day on which a currently employed person aged 18 years or over missed more than half a day from a job or business.

## Injury Terms

***Abbreviated Injury Scale (AIS).*** A six-point threat-to-life scale that categorizes injury severity based on the nature of the damage to different body regions, defined as follows: AIS 1 -- minor; AIS 2 -- moderate; AIS 3 – serious; AIS ***4*** -- severe; AIS 5 -- critical; AIS 6 – maximum.

***Cause of death.*** Every death is attributed to one underlying condition, based on information reported on the death certificate and utilizing the international rules for selecting the underlying cause of death from the reported conditions.

***Condition.*** A health condition is a departure from a state of physical and mental well-being. For NHIS, there are two types of condition: acute, which lasts less than three months and involves a physician visit or restricted activity; and chronic, which lasts three months or more.

***Death rate.*** A measure derived by dividing the number of deaths in **a** population in a given period by the resident population at the middle of that period.

***Disability.*** Any restriction or lack of ability to perform an activity in the manner, or in the range, considered normal.

***Drowning.*** A death resulting from suffocation within ***24*** hours of submersion in water.

***E-codes.*** International Classification of Diseases external cause of injury codes, developed by the World Health Organization. E-codes include injuries caused by motor vehicles, falls, firearms, drownings and near drownings, fires and burns, poisonings, and other causes.

***Epidemiology.*** The study of the distribution and determinants of health-related states and events in populations, and the application of this study to control health problems.

***Fatality. An*** injury that results in death.

***Fire/burn injury.*** Damage to tissue caused by thermal, chemical, electrical, radiation energy, or by inhalation of smoke and toxic fumes caused by a fire.

***Firearm injury.*** Damage to tissue caused by bullets fired from a firearm.

***Hospital discharge.*** The completion of any continuous period of stay of one night or more in a hospital as an inpatient.

***Hospitalized injury.*** An injury that results in hospitalization with survival to discharge.

***Impairment.*** A chronic physiological, psychological, or anatomical abnormality of bodily structure or function caused by disease or injury.

***Incidence.*** The number of instances of illness commencing, or of persons falling ill or sustaining injury, during a given period in a specified population. More generally, the number of new events, e.g., new cases of injury in a defined population.

***Incidence rate.*** A measure of the rate at which new events occur in a population, derived by dividing the number of injuries reported during a defined period of time by the number of persons in the stated population in which the cases occurred.

Injury. Damage to tissue caused by the exchange of kinetic, thermal, chemical, electrical or radiation energy at levels intolerable to tissue, or the deprivation of oxygen due to suffocation.

***Injury control.*** An organized effort to prevent injuries or to minimize their severity.

***Intent.*** The state of mind of persons involved in an injury episode which forms the basis for categorizing an injury as unintentional (traditionally termed accidental), as homicide/assault, or as suicide/self-inflicted.

***Intentional injury.*** An injury which is judged to have been purposely inflicted, either by the self or another.

***International Classification of Diseases (ICD) codes.*** A classification of the nature (N-Codes) and external cause of illness and injuries (E-Codes), developed by the World Health Organization.

***Motor vehicle injury.*** An injury sustained by a motor vehicle occupant, pedestrian, motorcyclist or bicyclist in motor vehicle crash.

***N-codes.*** International Classification of Diseases of the nature of the injury and body part affected, developed by the World Health Organization. N-codes include, for example, head injury, spinal cord injury, fractures, abdominal/thoracic injuries, and others.

***Near drowning.*** Survival for at least ***24*** hours after suffocation from submersion in water.

***Nonhospitalized injury.*** ***An*** injury requiring medical attention without hospitalization, or resulting in one or more days of restricted activity without medical attention.

***Prevalence.*** The number of instances of a given disease or disability in **a** given population at a designated time, regardless of the course of the disease or disability.

***Prevalence rate.*** The total number of all individuals who have a disease or disability at a particular time (or during a particular period) divided by the population at risk of having that disease or disability at this point in time or midway through the period.

***Severity score.*** A measure of the seriousness of an injury, usually related to probability of survival.

***Survival rate. The*** proportion of survivors in a group, e.g., of patients, studied and followed over a period.

***Unintentional injury.*** ***An*** injury which is judged to have occurred without anyone intending that harm be done.

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*'Passim' indicates repeated mention throughout the pages referenced

# *Biographical Sketches*

Alison S. Jones, B.A., Research Associate, Department of Health Policy and Management, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, MD, has investigated topics such as cost containment impact on the poor and uninsured, the impact of rural hospital closure on Medicare beneficiaries residing in rural counties, and the effects of competition on the market for physician services. She is currently a Ph.D. candidate in Health Economics.

Sharon R. Kaufman, Ph.D., Research Anthropologist, Institute for Health & Aging, University of California, San Francisco, is a medical anthropologist whose research includes studies of development in late life; the culture of American medicine; and chronic illness, disability, and rehabilitation. She is the author of The *Ageless Self: Sources of Meaning in Late Life.*

Gregory de Lissovoy, Ph.D., M.P.H., Assistant Professor, Department of Health Policy and Management, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, MD, teaches health care financial management and health economics. His research interests include medical technology assessment, alternative delivery systems, and home health care.

Ellen J. MacKenzie, Ph.D., Associate Professor of Health Policy and Management and Assistant Director of the Health Services Research and Development Center, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, MD, maintains research interests in severity measurement, the long-term impact of traumatic injuries, and the evaluation of emergency medical services.

Wendy Max, Ph.D., Assistant Professor of Economics, California State University, Hayward, CA, and Affiliated Faculty Member, Institute for Health & Aging, University of California, San Francisco, is a health economist. She conducts research on Alzheimer's disease, the cost of injury, and the economics of aging.

Elizabeth McLoughlin, Sc.D., Associate Director, Trauma Foundation, San Francisco General Hospital, San Francisco, CA, has worked for the prevention of injury since 1973, when she became director of burn prevention at the Shriners Burns Institute in Boston. She evaluates burn prevention education and laws related to residential smoke detectors and flammable fabrics and is involved in the public debate on motorcycle helmet laws.

Ted R. Miller, Ph.D., Senior Research Associate, The Urban Institute, Washington, D.C., has 18 years of experience in economics and public policy analysis. He has written extensively on issues related to

safety and insurance, including the cost of injury, the value of travel time, and the value of life.

**Ida VSW Red,** M.A., M.S.L.S., Senior Public Policy Analyst, Department of Social and Behavioral Sciences and Resource Director, Institute for Health & Aging, University of California, San Francisco, manages the research library and the publications program of the Institute. She is coeditor of *The* Nation's *Health* and coordinating editor of *Fiscal Austerity* and Long Term *Care* of *the Elderly.*

**Dorothy P. Rice,** Sc.D. (Hon.), Professor in Residence, Department of Social and Behavioral Sciences, with joint appointments at the Institute for Health & Aging and the Institute for Health Policy Studies, University of California, San Francisco, served from 1977 to 1982 as director of the National Center for Health Statistics. Previously she served as deputy assistant commissioner for research and statistics of the Social Security Administration. Her major interests are health statistics, the impact of an aging population, cost-of-illness studies, and the economics of medical care.

**Leon S. Robertson,** Ph.D., Lecturer at Yale University and President, Nanlee Research, a research firm in Branford, CT, has served on the faculties of Harvard University Medical School and Wake Forest University, was Senior Behavioral Scientist in the Insurance Institute for Highway Safety, and taught injury epidemiology in the Summer Session in Epidemiology at the Universities of Minnesota and Michigan for many years. He is coauthor of 5 books and author of *Injuries: Causes, Control Strategies and Public Policy,* as well as more than 100 articles and chapters in the scientific literature.

David S. Salkever, Ph.D., Professor, Department of Health Policy and Management, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, MD, has carried out research in a variety of areas in health economics over the past 20 years. His cost-related research includes studies of determinants of hospital cost inflation and cost control programs, cost-effectiveness in ambulatory care settings, the indirect cost of adult and children's chronic health problems and disabilities, and the direct and indirect cost of chronic back pain.

Gordon Smith, M.B., Ch.B., M.P.H., Assistant Professor, Department of Health Policy and Management, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, MD, is a member of The Johns Hopkins Injury Prevention Center faculty with a joint appointment in Epidemiology. He specializes in injury epidemiology and disease surveillance systems with research interests in alcohol and injury risk, drowning, injury in developing countries, and occupational injury. He is also a member of the World Health Organization Task Force to revise the External Cause Code for ICD-10.