



# MONASH University

## Accident Research Centre

### THE COST OF INJURY TO VICTORIA

by

Wendy L. Watson &  
Joan Ozanne-Smith

December, 1997

Report No. 124



MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE  
REPORT DOCUMENTATION PAGE

---

<b>Report No.</b>	<b>Date</b>	<b>ISBN</b>	<b>Pages</b>
124	December, 1997	0 7326 0704 3	104 + Appendices

---

**Title and sub-title:** The Cost of Injury to Victoria.

---

**Author(s)** Wendy L. Watson & Joan Ozanne-Smith  
**Type of Report & Period Covered:** 1993/94

---

**Sponsoring Organisation(s):**

This project was funded by the Department of Human Services, Victoria.

---

**Abstract:**

Injury has been identified as a major public health problem in Australia and internationally. It is the leading cause of death of persons aged between 1 and 44 years, accounting for up to 72% of deaths in some age groups (eg. 15-24 years). The cost of injury also imposes an enormous burden on the community in Australia with a 1986 figure of \$11 billion per year still quoted as the best available estimate.

The aim of this study is to broadly describe the epidemiology of injury in the State of Victoria at all levels of severity and to provide an estimate of the total lifetime cost of injury to the Victorian community for cases incident in a given year.

The incidence of both unintentional and intentional injury in Victoria in 1993/94 was directly derived, or estimated from, the available Victorian health sector and Coronial data bases for three level of severity : deaths, hospitalisations and medical treatment only. Incidence was also established for the different causes of injury, age and gender groups, location of the injury event and activity being undertaken at the time of injury.

In 1993/94, injuries resulted in at least 1,487 deaths (with an estimated 142 deaths occurring in later years as a result of injuries sustained in that year), 67,402 persons hospitalised, and an estimated 397,160 medically-treated, non-hospitalised injured persons in Victoria in 1993/94. In total, over 466,000 people were injured or 10.5 persons injured per year for every 100 Victorian residents.

Average treatment costs for each level of injury severity were provided by the State's injury compensation schemes, the Transport Accident Commission and the Victorian WorkCover Authority. A matrix, based on nature of injury by body part, was also developed, in conjunction with the Victorian WorkCover Authority, to allow more specific allocation of direct costs to the various injury cause and age categories for hospitalised cases (hospitalised cases accounting for the major part of treatment costs). Indirect costs were estimated using the human capital method.

The total lifetime cost of injury sustained in 1993/94, in Victoria, is \$2,583 million, consisting of direct costs of \$759 million, plus indirect costs including mortality costs of \$813 million and morbidity costs of \$1,010.5 million.

---

**Key Words:**

**(IRR D except when marked\*)**  
wounds and injuries - Economics  
cost of injury

**Disclaimer**

This report is disseminated in the interest of information exchange. The views expressed here are those of the authors, and not necessarily those of Monash University

---

Reproduction of this page is authorised

Monash University Accident Research Centre,  
Wellington Road, Clayton, Victoria, 3168,  
Australia.  
Telephone: +61 3 9905 4371  
Fax: +61 3 9905 4363

---



# Contents

<b>PROJECT ADVISORY COMMITTEE .....</b>	<b>ix</b>
<b>ACKNOWLEDGMENTS .....</b>	<b>xi</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>xiii</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1 BACKGROUND .....	1
1.2 AIM.....	1
1.2.1 Specific Objectives .....	1
<b>2. LITERATURE REVIEW .....</b>	<b>3</b>
2.1 INCIDENCE VERSUS PREVALENCE .....	3
2.2 TYPE OF COSTS .....	3
2.3 THE VALUE OF LIFE.....	4
2.4 THE HUMAN CAPITAL APPROACH.....	5
2.4.1 Advantages of the human capital approach .....	5
2.4.2 Disadvantages of the human capital approach.....	6
2.5 THE WILLINGNESS TO PAY APPROACH.....	6
2.5.1 Advantages of the willingness-to-pay approach.....	7
2.5.2 Disadvantages of the willingness-to-pay approach .....	7
2.6 WHICH APPROACH? .....	7
2.7 THE COST OF INJURY IN AUSTRALIA.....	8
<b>3. METHODOLOGY .....</b>	<b>11</b>
3.1 INCIDENCE ESTIMATION AND DATA SOURCES .....	11
3.1.1 Data Sources .....	11
3.1.2 Methods .....	12
3.1.2.1 Deaths.....	12
3.1.2.2 Hospitalisations .....	13
3.1.2.3 Non-hospitalised cases .....	14
3.1.2.4 Setting and activity at time of injury .....	15
3.2 COST ESTIMATION METHODS AND DATA SOURCES .....	16
3.2.1 Data sources.....	17
3.2.2 Methods .....	18
3.2.2.1 Deaths.....	18
3.2.2.2 Hospitalisations .....	19
3.2.2.3 Non-hospitalised cases .....	21
3.2.2.4 Setting and activity at time of injury .....	22
<b>4. STRENGTHS AND LIMITATIONS OF THE STUDY .....</b>	<b>23</b>
4.1 LIMITATIONS .....	23
4.2 STRENGTHS.....	24

<b>5. THE INCIDENCE OF INJURY .....</b>	<b>25</b>
5.1 OVERVIEW .....	25
5.2 AGE AND GENDER PATTERNS .....	25
5.3 CAUSE OF INJURY .....	30
5.4 INTENT OF INJURY .....	33
5.5 HOSPITALISED INJURIES BY BODY REGION AND NATURE OF INJURY .....	35
5.6 INJURY SETTING & ACTIVITY AT TIME OF INJURY .....	37
<b>6. THE ECONOMIC COST OF INJURY .....</b>	<b>39</b>
6.1 OVERVIEW .....	39
6.2 AGE & GENDER PATTERNS .....	40
6.2.1 Gender .....	40
6.2.2 Age .....	40
6.3 CAUSE OF INJURY .....	41
6.4 INTENT OF INJURY .....	42
6.5 INJURY SEVERITY .....	53
6.5.1 Age and gender .....	53
6.5.2 Cause of injury .....	54
6.6 SETTING AND ACTIVITY AT TIME OF INJURY .....	54
6.7 TYPE OF COST .....	58
6.7.1 Direct cost.....	58
6.7.2 Morbidity Cost.....	60
6.7.3 Mortality Cost.....	63
<b>7. SOURCES OF PAYMENT (DIRECT COSTS) .....</b>	<b>69</b>
<b>8. ALTERNATIVE MEASUREMENTS OF THE BURDEN OF INJURY .....</b>	<b>73</b>
8.1 THE WILLINGNESS-TO-PAY APPROACH.....	73
8.2 LIFE-YEARS LOST.....	74
8.3 OTHER QUALITY OF LIFE MEASURES .....	74
<b>9. DISCUSSION .....</b>	<b>77</b>
9.1 VALIDATION.....	77
9.2 INJURY AS A PUBLIC HEALTH ISSUE .....	78
9.3 POSSIBLE PRIORITIES FOR PREVENTION.....	78
9.4 ALLOCATION OF RESOURCES.....	79
9.5 DISSEMINATION .....	79
<b>10. RECOMMENDATIONS.....</b>	<b>81</b>
10.1 INJURY PREVENTION AND CONTROL.....	81
10.1.1 Data issues .....	81
10.1.2 Further research .....	82
<b>11. REFERENCES.....</b>	<b>83</b>

## Figures

FIGURE 5-1	DISTRIBUTION OF INJURED PERSONS BY GENDER AND SEVERITY OF INJURY, 1993/94 .....	28
FIGURE 5-2	DISTRIBUTION OF INJURED PERSONS BY AGE AND SEVERITY OF INJURY, 1993/94 .....	28
FIGURE 5-3	NUMBER OF INJURY DEATHS AND INJURY DEATH RATES BY AGE-GROUP AND GENDER.....	29
FIGURE 5-4	NUMBER OF HOSPITALISED INJURIES AND HOSPITALISED INJURY RATES BY AGE-GROUP AND GENDER.....	29
FIGURE 5-5	NUMBER OF NON-HOSPITALISED INJURIES AND NON-HOSPITALISED INJURY RATES BY AGE-GROUP AND GENDER .....	30
FIGURE 5-6	DISTRIBUTION OF INJURED PERSONS BY CAUSE AND SEVERITY OF INJURY, 1993/94. ....	32
FIGURE 5-7	FATALITIES BY INTENT, VICTORIA, 1993/94 .....	34
FIGURE 6-1	LIFETIME COST OF INJURY BY TYPE OF COST AND GENDER, 1993/94.....	44
FIGURE 6-2	DISTRIBUTION OF INJURED PERSONS AND LIFETIME COST BY AGE, 1993/94.....	45
FIGURE 6-3	DISTRIBUTION OF LIFETIME COST OF INJURY BY AGE AND TYPE OF COST, 1993/94.....	46
FIGURE 6-4	DISTRIBUTION OF INJURED PERSONS AND LIFETIME COST BY CAUSE, 1993/94. ....	48
FIGURE 6-5	DISTRIBUTION OF LIFETIME COST OF INJURY BY CAUSE AND TYPE OF COST, 1993/94.....	51
FIGURE 6-6	INJURY MORTALITY LOSSES BY GENDER, 1993/94.....	65
FIGURE 6-7	INJURY MORTALITY LOSSES BY AGE, 1993/94 .....	66
FIGURE 6-8	INJURY MORTALITY LOSSES BY CAUSE, 1993/94. ....	68

## Tables

TABLE 5-1	NUMBER AND RATE OF INJURED PERSONS BY SEX, AGE, AND INJURY SEVERITY, VICTORIA, 1993/94.....	27
TABLE 5-2	NUMBER AND RATE OF INJURED PERSONS BY CAUSE OF INJURY AND INJURY SEVERITY, VICTORIA, 1993/94.....	31
TABLE 5-3	NUMBER AND RATE OF INJURED PERSONS BY INTENT AND SEVERITY OF INJURY, VICTORIA, 1993/94.....	34
TABLE 5-4	NUMBER AND RATE OF INJURY HOSPITALISATIONS BY BODY REGION OF INJURY, VICTORIA, 1993/94.....	36
TABLE 5-5	NUMBER AND RATE OF INJURY HOSPITALISATIONS BY NATURE OF INJURY, VICTORIA, 1993/94. ....	36
TABLE 5-6	NUMBER AND PERCENTAGE OF INJURED PERSONS BY SETTING OF INJURY EVENT AND INJURY SEVERITY, VICTORIA, 1993/94.....	38
TABLE 5-7	NUMBER AND PERCENTAGE OF INJURED PERSONS BY ACTIVITY AT TIME OF INJURY AND INJURY SEVERITY, VICTORIA, 1993/4.....	38
TABLE 6-1	LIFETIME COST OF INJURY BY AGE, GENDER AND TYPE OF COST, 1993/94.....	43
TABLE 6-2	LIFETIME COST OF INJURY BY CAUSE AND TYPE OF COST, 1993/94 .....	47
TABLE 6-3	LIFETIME COST OF INJURY BY AGE, GENDER AND CAUSE, 1993/94. ....	49
TABLE 6-4	LIFETIME COST OF INJURY PER INJURED PERSON BY AGE, GENDER AND CAUSE, 1993/94 .....	50
TABLE 6-5	TOTAL LIFETIME COST OF INJURY BY AGE, GENDER AND LEVEL OF INJURY SEVERITY, 1993/94 .....	55
TABLE 6-6	TOTAL LIFETIME COST OF INJURY BY CAUSE AND LEVEL OF INJURY SEVERITY, VICTORIA, 1993/94.....	56
TABLE 6-7	TOTAL LIFETIME COST OF INJURY, SETTING OF INJURY EVENT BY INJURY SEVERITY, VICTORIA, 1993/94.....	57
TABLE 6-8	TOTAL LIFETIME COST, ACTIVITY AT TIME OF INJURY BY INJURY SEVERITY, VICTORIA, 1993/4. ....	57
TABLE 6-9	ESTIMATED TOTAL LIFETIME DIRECT COST OF TREATMENT, INJURY CAUSE BY LEVEL OF SEVERITY, VICTORIA, 1993/94.....	59
TABLE 6-10	ESTIMATED LIFETIME DIRECT COST OF TREATMENT, TYPE OF EXPENDITURE BY LEVEL OF SEVERITY, VICTORIA, 1993/94.....	59
TABLE 6-11	INJURY MORBIDITY LOSSES BY AGE AND GENDER, VICTORIA, 1993/94. ....	61
TABLE 6-12	INJURY MORBIDITY LOSSES BY GENDER AND CAUSE, VICTORIA, 1993/94 .....	62
TABLE 6-13	INJURY MORTALITY LOSSES BY AGE AND GENDER, 1993/94 .....	64
TABLE 6-14	INJURY MORTALITY LOSSES BY GENDER AND CAUSE, 1993/94, VICTORIA.....	67
TABLE 7-1	DIRECT COST OF INJURIES SUSTAINED IN 1993/94 (TO 31/12/96), TYPE OF EXPENDITURE BY SOURCE OF PAYMENT (TAC, WORKCOVER & OTHER), VICTORIA. ....	69
TABLE 7-2	DIRECT COST OF INJURIES SUSTAINED IN 1993/94 (TO 31/12/96), TYPE OF EXPENDITURE BY SOURCE OF PAYMENT, VICTORIA.....	71
TABLE 8-1	ADJUSTED PERSON COSTS - WILLINGNESS-TO-PAY .....	73
TABLE 8-2	TOTAL INDIRECT COST ESTIMATES - WILLINGNESS-TO-PAY.....	74

TABLE 8-3	POTENTIAL LIFE-YEARS LOST BY SEVERITY, AGE AND GENDER, VICTORIA, 1993/94.....	75
TABLE 8-4	POTENTIAL LIFE-YEARS LOST BY GENDER, SEVERITY AND CAUSE OF INJURY, VICTORIA, 1993/94.....	76

## **List of Appendices**

APPENDIX A	CAUSE CATEGORIES : E-CODE GROUPINGS
APPENDIX B	NATURE OF INJURY & BODY PART INJURED (HOSPITALISATIONS)
APPENDIX C	INCIDENCE - DETAILED TABLES
APPENDIX D	ECONOMIC COSTS - DETAILED TABLES
APPENDIX E	PAID AND UNPAID PRODUCTION LOSSES : METHODOLOGY AND TABLES OF RESULTS



# PROJECT ADVISORY COMMITTEE

A project advisory committee was established to provide the Department of Health & Community Services and Monash University Accident Research Centre with advice on issues related to the study such as methodology, health economics and information about sectors included in the study (eg. transport and work-related injury).

## **Chair :**

Prof. Peter Vulcan  
Director, Monash University Accident Research Centre.

## **Members :**

Dr. Peter Cameron  
Director, Department of Emergency Medicine, Royal Melbourne Hospital.

Dr. Rob Carter  
Centre for Health Program Evaluation.

Mr. Arvie Dobson  
Manager, Social Statistics Unit, Australian Bureau of Statistics.

Ms. Sharon Lee  
Research Officer, Research & Development, Victorian WorkCover Authority.

Prof. Joan Ozanne-Smith  
Professorial Fellow, Monash University Accident Research Centre.

Ms. Bronwyn Richardson  
Manager, Research & Development, Victorian WorkCover Authority.

Mr. Ian Scott  
Deputy Executive Director, Kidsafe Australia.

Ms. Catherine Thompson  
Public Health, Victorian Department of Human Services.

Mr. Martin Turnbull  
Public Health, Victorian Department of Human Services.

Ms. Wendy Watson  
Research Fellow, Monash University Accident Research Centre.



## ACKNOWLEDGMENTS

The authors would like to thank the Project Advisory Committee for their time and input into the study. In particular, Rob Carter and Peter Vulcan for their time, in addition to committee meetings, in discussing the conceptual and methodological problems associated with a study of this type and magnitude. Special thanks also to Sharon Lee from the Victorian WorkCover Authority for her untiring and cheerful assistance in response to numerous requests for payments data and other information.

We would also like to thank the Victorian WorkCover Authority, the Transport Accident Commission and the Australian Bureau of Statistics for the provision of data. Thanks also to the Victorian Coroner's Office and the Department of Human Services for provision of databases (the Victorian Coroner's Facilitation System and the Victorian Inpatient Minimum Dataset) held at Monash University Accident Research Centre; the hospitals which collect data for the Victorian Emergency Minimum Dataset; the collecting general practitioners, the Central West Gippsland Division of General Practice and the Monash University Centre for Rural Health for their participation in the Extended Latrobe Valley Injury Surveillance project and the Victorian Spinal Cord Services at the Austin Hospital for data relating to spinal cord injury in Victoria.

Thanks also to the staff at MUARC, in particular Voula Stathakis, Mark Sinclair Stokes and Stephen Begg for the extraction of injury data from the various databases held at the Centre. Special thanks also to Anita Imberger for her assistance in producing the numerous tables and figures contained in this report and to Marg Young for formatting and preparing the report for publication.



# EXECUTIVE SUMMARY

This study broadly describes the epidemiology of injury in the State of Victoria at various levels of severity and provides an estimate of the total lifetime cost of injury to the Victorian community for cases which occurred in the financial year 1993/94, the most recent year for which reliable incidence data for each level of injury severity were available.

## METHODOLOGY

### Incidence

Fundamental to developing estimates of the economic cost of injury are data on incidence. Estimates of the numbers and rates of injury are presented in this report for three mutually exclusive groups that broadly reflect the severity of injury : (1) injury resulting in death, (2) injury resulting in hospitalisation with survival to discharge, and (3) injury requiring medical attention without hospitalisation. Incidence was also established for the different causes of injury, age and gender groups, location of the injury event and activity being undertaken at the time of injury. Because important segments such as sporting, home and workplace injuries are concealed by the ICD-9 classification by cause, incidence estimates for each level of injury severity were also developed for the settings in which injury events occur and the activity being undertaken at the time of injury.

The major data sources used in estimating the number of injuries that occurred in Victoria in 1993/94 were the Victorian Coroners Facilitation System (VCFS) for deaths, the Victorian Inpatient Minimum Dataset (VIMD) for live hospital discharges and the Victorian Emergency Minimum Dataset (VEMD) and the Extended Latrobe Valley Injury Surveillance (ELVIS) for less severe, non-hospitalised injuries. Injuries for which medical attention was not sought at either a hospital Emergency Department or a general practice have not been included since there is no data currently available on the frequency of such cases. This will result in an underestimation of both the incidence of injury and the costs.

### Cost

The total lifetime cost of injury estimated in this study consists of costs relating to the treatment of injury (direct costs) and costs relating to the loss, or partial loss, to society of the productive efforts (both paid and unpaid) of injury victims and care-givers in the case of children (indirect costs).

Direct or treatment costs are the actual expenditure related to the injury and include medical and non-medical costs such as hospital (inpatient and Emergency Department), medical (general & specialist services) and rehabilitation (rehabilitation services, aids and equipment) costs associated with the treatment of injury. Other direct costs include ambulance transport, pharmaceuticals and treatment by health professionals other than medical doctors.

Average treatment costs for each level of injury severity were provided by the State's injury compensation schemes, the Transport Accident Commission and the Victorian WorkCover Authority. A matrix, based on nature of injury by body part, was also developed, in conjunction with the Victorian WorkCover Authority, to allow more specific allocation of direct costs to the various injury cause and age categories for hospitalised cases (hospitalised cases accounting for the major part of treatment costs).

Indirect costs represent the value of lost output due to reduced productivity caused by injury and any resultant disability (morbidity) and losses due to premature death (mortality). Loss or partial loss of future production has been estimated in terms of earnings and labour on-costs of injury victims, the productive but unpaid contribution of victims to their households and communities and the productive time lost by care-givers of child injury victims.

Indirect costs were estimated using the ex-post human capital method by assigning an economic value to the loss of life and productive capacity resulting from injury, following the work of Rice et al. (1989) and the Bureau of Transport and Communication Economics (BTCE, 1992). In contrast to the BTCE (1992), which used the accident as the basic costing unit, in this study the basic costing unit is the injured person.

Since the willingness-to-pay approach to valuing indirect cost is becoming more common, estimates of this cost in relation to injury in Victoria (based on overseas estimates of the value of life and non-fatal injuries), were also developed for reference purposes.

## **OVERVIEW OF RESULTS**

### **Incidence**

In 1993/94, injuries resulted in at least 1,487 deaths (with an estimated 142 deaths occurring in later years as a result of injuries sustained in that year), 67,402 persons hospitalised, and an estimated 397,160 medically-treated non-hospitalised injured persons in Victoria. In total, over 466,000 people were injured or 10.5 persons injured per year for every 100 Victorian residents. Just over one in 10 persons in this State, in a year, sustain an injury that requires at least an attendance at a hospital Emergency Department or a general practitioner's surgery. Many of these injuries are fatal or serious enough to require hospitalisation and are associated with long-term disability.

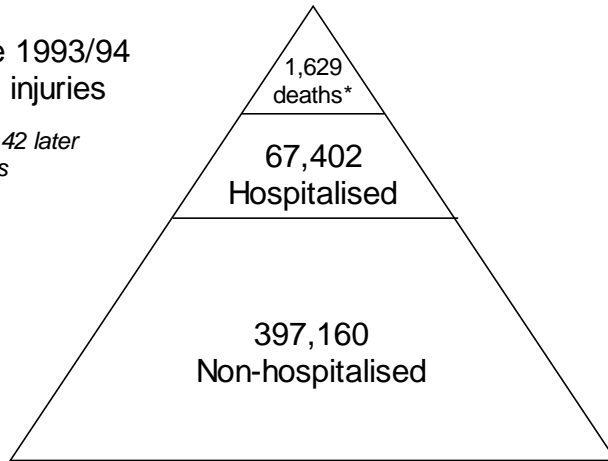
Of the total 466,049 persons injured, almost 30 percent (134,543) were in the 25-44 year age-group (who account for 31 percent of the Victorian population). Persons aged 15-24 comprise almost 16 percent of the Victorian population yet account for more than 20 percent (103,704) of all injuries. While children under the age of 15 account for 21 percent of the total Victorian population, they comprise almost 30 percent of the total injured population (about 131,500 injuries). Overall, persons aged under 45 years sustain almost 80 percent of all injuries.

The risk of injury is higher among males who sustain almost 62 percent of all injuries yet account for only 49.5 percent of the population. Almost 13 percent of Victorian males incur injuries, whereas for females the risk is lower with about 8 percent sustaining an injury in a year. Among both males and females the largest number of injuries occurs in the 25-44 year age-group. The risk of injury is highest, however, for younger males with more than one in five (or 20 percent of) males aged 15-24 sustaining an injury during a single year. Overall, the leading cause of injury death in Victoria is suicide, followed by motor vehicle accidents, whereas falls are the leading cause of hospitalisation and of all non-fatal injury.

Most injuries occur in the home (36 percent) followed by areas of sport and recreation (12.5 percent) then transport (11.7 percent). In terms of activity being undertaken at the time of injury, most injuries were associated with sport and leisure activities (40.2 percent) followed by work-related injury (11 percent) then transportation injuries (10.8 percent).

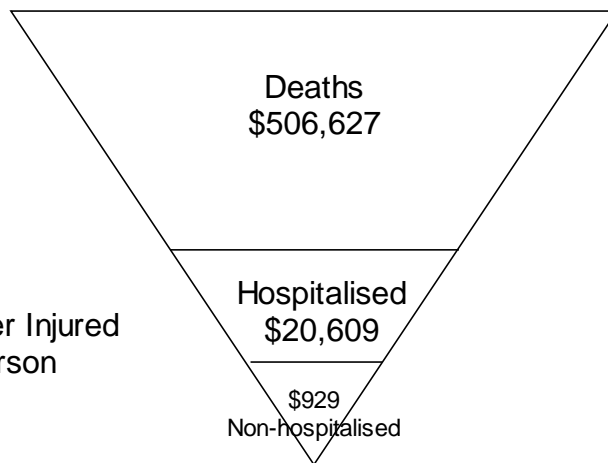
Incidence 1993/94  
466,191\* injuries

*\*includes 142 later  
year deaths*



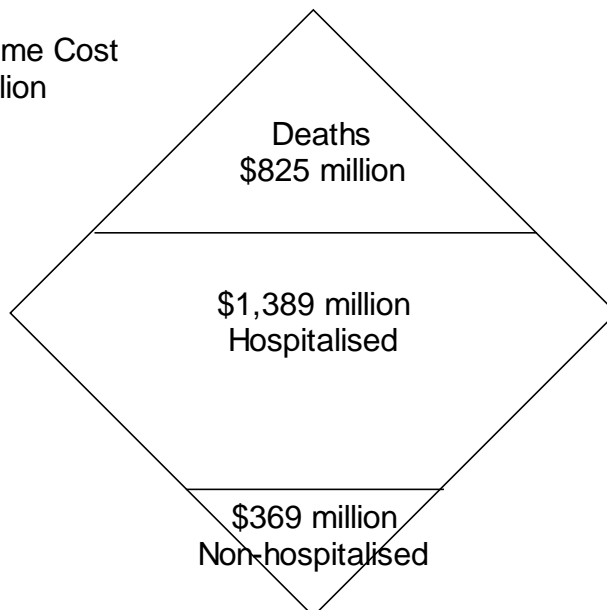
X

Cost per Injured  
Person



=

Total Lifetime Cost  
\$2,583 million



## Cost

The total lifetime cost of injury for persons who sought medical treatment for injury in Victoria in 1993/94, is estimated at \$2,582.9 million, or an average of \$5,541 per injured person. Direct expenditure for treatment of injury including hospital, medical, pharmaceuticals, rehabilitation, attendant and nursing home care and other services amount to almost \$759 million or \$1,628 per injured person. (Note that average costs are skewed towards the cost of non-hospitalised injury due to the large number of cases in this category).

Disability from injury results in loss of output with individuals generally, unable to attend to their normal activities (eg domestic duties), and members of the labour force, unable to work. In total more than 59,000 life-years (to age 75) are lost (46.5 days per injured person) as a result of injuries sustained in 1993/94, valued at \$1,010.5 million. The morbidity cost amounts to an average of \$2,175 per injured person.

Other losses result from premature injury fatalities. At least 1,487 premature deaths from injury occurred in 1993/94, with an estimated additional 142 deaths occurring in later years as a result of injury sustained in 1993/94. Premature death from injury amounted to an estimated annual loss of 48,773 life years (to age 75), or 30 years per death. The mortality cost amounted to \$813.5 million, or an average cost of \$499,378 per death.

In terms of cause, the greatest losses are due to motor vehicles traffic accidents and falls, accounting for \$570.5 million and \$557.2 million respectively. Although the injury rate for falls is higher than for motor vehicle accidents, the significantly higher number of motor vehicle fatalities among young people results in higher lifetime costs. Motor vehicle traffic injuries account for 7 percent of all injuries and 22 percent of total economic costs whereas falls account for almost 28 percent of injuries and 21.5 percent of total lifetime costs. Self-inflicted injury ranks third in economic cost, amounting to \$428.4 million, or 16.5 percent of the total cost. Although self-inflicted injury accounts for only 1.8 percent of all injuries, fatalities at young ages are high (the suicide rate is highest in the 15-24 year-old age-group), resulting in high costs.

## CONCLUSIONS

It is clear from the results of this study that injuries have a significant impact on the Victorian community, health care system and economy in general. The impact of disability due to injury on the individual and his/her family can be personally and economically devastating. All sectors of the Victorian economy share this burden, including federal, state and local governments, the private sector and individuals. In addition to the reduction in injured person-based costs identified in this study, effective injury prevention measures would also provide savings in non-person based costs of injury events such as property damage, fire, police and judicial services, etc.

While other factors, particularly preventability, must also be taken into consideration in determining priorities for injury prevention, this study identifies the following groups as over-represented in epidemiological or cost terms :

- Suicide is the leading cause of injury death in Victoria followed by motor vehicle traffic accidents. As such these two causes also account for the highest mortality costs.
- Falls are the leading cause of non-fatal injury in Victoria. They also account for the highest total direct treatment costs and highest overall morbidity costs.
- Males are over-represented in epidemiological terms. While they represent 49.5 percent of the population, they sustain 62 percent of all injuries. Almost three-quarters of injury fatalities and over 60 percent of non-fatal injuries occur among males.



- Young people aged 15-24 years are over-represented in both epidemiological and cost terms. This age-group accounts for 22 percent of all injuries and almost 28 percent of the total lifetime cost, yet represents around 16 percent of the Victorian population. Persons in this age-group also have the highest per person mortality costs averaging \$813,286 per death.
- Adults aged 25-44 are over-represented in terms of cost. Although this age-group represents 31 percent of the total Victorian population and accounts for a similar percentage of all injuries (29 percent), persons aged 25-44 years account for 37 percent of the total lifetime costs of injury.
- Drowning/near-drowning have the highest average lifetime cost at \$61,866 per person followed by suicide/self-harm at \$51,540 per person.
- Elderly persons over the age of 75 years have the highest direct treatment costs averaging \$5,048 per injured person. This is due mainly to the high number of falls suffered in this age group.
- Most injuries, at all levels of severity, occur in the home.
- In terms of activity, sports and leisure activities are responsible for the greatest number of non-fatal injuries.

## **RECOMMENDATIONS**

Recommendations have emerged from this study for the prevention and control of injury in Victoria.

- It is clear that, in terms of cost alone, injury is responsible for an enormous burden to the state of Victoria. It is recommended that more resources be directed towards the prevention of injuries and the reduction of their effects through the application of existing knowledge and the development and evaluation of new strategies.
- It is recommended that research and controlled experiments be conducted to evaluate the effectiveness and cost savings of a range of injury control interventions and that programs are shown to be cost-effective be implemented.
- There is evidence for the effectiveness of a number of injury prevention strategies. It is recommended that research be conducted to evaluate the economic and/or societal barriers to the application of such strategies.

Several other recommendations are made regarding data issues and further research into the epidemiology and cost of injury that supports the development of priorities and the prevention of injuries in Victoria.



# 1. INTRODUCTION

## 1.1 BACKGROUND

Injury has been identified as a major public health problem in Australia and internationally (Nutbeam et al, 1993). Although injury accounted for only 5.7 percent of all deaths in Australia in 1994 (NISU, 1996), it is the leading cause of death of persons aged between 1 and 44 years, accounting for 38 percent of deaths in children (1-14 years) and 72 percent of deaths in the 15-24 year old age-group (Australian Bureau of Statistics, 1995). It is also the single leading cause of inpatient hospital episodes in this country (Gillet, Liu & Solon, 1993). Although the cost of injury imposes an enormous burden on society little has been published on the total economic cost of injury in Australia. A 1986 figure of \$11 billion per year is still quoted as the best available estimate (Better Health Commission, 1986) of the total cost of the burden of injury to Australia.

There are several purposes in establishing the economic consequences of injury. The first is to assess the burden of injury to the community. While it is extremely difficult to quantify all aspects of the burden injury imposes on society, it is important to translate this burden into economic terms in order to facilitate decision making in relation to the appropriate resourcing of the research and intervention effort in this area.

It also provides another way of highlighting the significance of a particular injury, over and above the usual epidemiological measures of mortality and morbidity. Injuries resulting from falls, for example, may not result in as many deaths as say, road traffic accidents, but as a major source of hospitalisations and possibly long-term disability, injuries from falls may result in significant reductions in the quality of life and the consumption of health care resources.

The cost of injury also provides important baseline information necessary for establishing benefits-cost estimates for intervention strategies. This only applies to incidence-based estimates, however, since these model the 'do nothing' or, current care, option against which new interventions can be assessed.

It should be noted that while economic costs are important in determining research and prevention priorities, decisions on the allocation of resources should also take into account the frequency and rate of injury, injury severity and the availability and effectiveness of interventions.

## 1.2 AIM

The main objective of this study is to provide an estimate of the **total economic cost of injury** to the Victorian community and to determine, to the extent possible, who pays.

### 1.2.1 Specific Objectives

- (1) To conduct an international literature review of studies on the cost of injury.
- (2) To broadly describe the epidemiology of injury in Victoria at all levels of severity by means of analyses of available databases to determine the role of health professionals such as chiropractors, physiotherapists, etc. (for whom no data is currently available).
- (3) To articulate a methodology for attributing treatment and non-treatment costs of injuries.

- (4) To estimate the treatment costs related to injury in Victoria for the financial year 1993-94 within the limitations of the available data and to establish, where possible, who actually pays these costs.
- (5) To estimate the other (non-treatment) costs of injury to Victoria in 1993-94 within the limitations of the available data and to identify, where possible, who actually pays these costs.
- (6) To the extent possible, on the basis of the findings, provide recommendations as to areas where possible savings may be made if relevant injury prevention strategies were implemented.

## 2. LITERATURE REVIEW

A review of the international literature on cost of illness theory, methodology and practice revealed a variety of methods for estimating cost, making direct comparisons between studies difficult. The methodology chosen in a particular costing exercise will depend on several factors. The perspective chosen by the researchers will determine the type of costs included and the way in which the findings are expressed. For example, those interested solely in the impact of a particular injury on medical spending will only be concerned with direct treatment costs and will ignore quality of life issues. As Miller and Levy (1997) point out, it is “generally desirable to present a societal perspective that takes into account costs and benefits to all members of society.” While this is the most relevant for public decision-making, the extent to which this can be achieved is often solely determined by the availability and quality of data.

### 2.1 INCIDENCE VERSUS PREVALENCE

Fundamental to developing estimates of the economic cost of injury are reliable epidemiological data by age and gender (and cause categories if considering the whole spectrum of injury). Cost of illness studies can be undertaken using either a prevalence- or incidence-based approach.

The **prevalence approach** estimates the total cost of a disease or injury in a given year, irrespective of onset. The **incidence approach** estimates the lifetime cost of cases first diagnosed (or injuries sustained) in a the base year. The incidence approach is more demanding in terms of data since it requires estimates to be made about the course of treatment and the length of disability. However, it is more useful than the prevalence approach as estimates calculated in this way give a baseline against which new interventions can be assessed. Incidence-based estimates model the ‘do nothing’, or current care, option. Prevalence based-studies, on the other hand, do not have this advantage and should be viewed as stand-alone exercises unless the full effects of a potential intervention are likely to be felt within a single year (Drummond, 1992).

### 2.2 TYPE OF COSTS

Two main types of societal cost of injuries can be identified. These are (1) the economic costs and (2) the human costs.

#### 1. Economic costs

These include **direct costs** which represent the actual expenditure related to the injury and include medical and non-medical costs such as hospital (inpatient and Emergency Department), medical (general & specialist services) and rehabilitation (rehabilitation services, aids and equipment) costs associated with the treatment of injury. Other direct costs include ambulance transport, pharmaceuticals and treatment by health professionals other than medical doctors. They may also include the cost of caring for an injured person at home such as attendant care or visits by a nursing service as well as the services of family and friends who care for the injured.

Legal costs and property damage may be included. However, information about these costs is not available for all causes of injury. While data for property damage, for example, is probably available for road traffic accidents and house fires in Victoria, it is not available for other injury events. Property damage and legal costs can account for a significant proportion of the total cost of an injury event (Bureau of Transport and Communication Economics, 1992).

Economic costs also include **indirect costs** which represent the value of lost output due to reduced productivity caused by injury and any resultant disability (**morbidity**) and losses due to premature death (**mortality**). These costs are usually estimated using the **human capital approach** (described below).

## 2. Human costs

Other approaches to the costing of illness, such as the **willingness-to-pay method**, incorporate other aspects of well-being such as the value of leisure, pain and suffering. Some authors (eg. Koopmanschap, 1994) argue it is more appropriate to consider these non-monetary costs (pain, suffering, etc.) as health effects and to quantify them in terms of reduced quality of life so reducing the risks of double counting (both as costs and health effects). The estimated value of the foregone quality of life due to injury is often described by a measure of health status such as the quality adjusted life year, or QALY. QALYs (and variants, such as the World Health Organisation and World Bank's disability adjusted life years; Murray, 1994) are scales that value a year in any given health state between death and perfect health. QALYs reflect not only years of life saved but also the degree of functioning and health during those years (Miller & Levy, 1997).

### 2.3 THE VALUE OF LIFE

Conceptual questions are the greatest source of uncertainty in indirect cost estimates. The most complex and controversial issues arise in determining the 'value of life'.

'Much of the controversy... is based on a neglect of the difference between a particular, individual life and an anonymous, statistical life. Western society places a very high value on the individual, as demonstrated, for example, by the very great efforts which are sometimes devoted to rescuing individuals in distress. Such efforts are dictated by moral considerations and are not subject to benefit-cost analyses.

Investment in safety measures is a very different question because the beneficiaries are the anonymous, potential victims of future random events. Their moral status is quite different from that of particular individuals in distress. The view taken in cost of illness or injury studies is that life generally, and improvements in human health, have finite values and that estimates of these values can be made.'

Bureau of Transport & Communication Economics/ Environmental Protection Authority,  
1993

Two main approaches are commonly used in determining the indirect costs associated with injury - the human capital approach and the willingness-to-pay approach. Although they are fundamentally different in their approach and essentially measure different things both impute a 'value' to human life.

## 2.4 THE HUMAN CAPITAL APPROACH

Despite many criticisms, the human capital approach is still the most commonly used method for valuing the foregone productivity, or indirect cost, of illness or injury. The human capital approach values people in terms of their production. An individual is seen as producing over time a stream of output valued at market earnings or by the imputed worth of housekeeping services (Rice et al., 1989). This earnings stream is cut short by premature death or reduced due to recuperation and/or incapacity following an injury.

The **mortality cost** is the value of lost productivity resulting from injury deaths, calculated as the product of the number of injury-caused deaths and the present value of future production. Lost productivity can include both paid and unpaid production costs.

Paid production (lifetime earnings) is usually derived from average or median earnings for full-time employees plus labour on-costs. Earnings specific to age and gender are then applied to the number of years remaining in the labour force as a discounted earnings stream and adjusted for annual productivity gains over the relevant period to produce an estimate of lost production at present values. These figures are further adjusted to take into account the varying labour force participation rates for each age and gender group.

A large amount of unpaid household and voluntary community work is performed by both employed and non-employed persons. When a person dies or is incapacitated this production is also foregone and represents a social cost. The BTCE (1992) used the opportunity cost approach in valuing the unpaid production component of their estimates of the value of future production. This method assumes that the worker has given up paid work in order to perform unpaid work and hence household and community work is valued in terms of earnings foregone, as measured by median weekly earnings by age and gender. The value of foregone family and community work was calculated using the working life tables. The hours of unpaid work were converted to an annual wage and added to the age and gender specific calculation of foregone earnings to produce the total value of future production.

The **morbidity cost** is an estimate of the productive capacity is lost to the community while an injured person is hospitalised or unable to perform their normal activities. Comprehensive information on the length of the period of total or partial disability as a result of injury is not always available. Length of stay in hospital (with a weighting to allow for recuperation) and the number of attendances for treatment (in the case of non-hospitalised injury) are often used for estimating the period over which productive capacity is lost or reduced. Morbidity costs are calculated in a similar way to mortality costs as a product of the time lost by the appropriate wage rate (by age and gender).

### 2.4.1 Advantages of the human capital approach

The human capital approach has the important advantage of employing data that is reliable and readily available. The human capital approach is relatively straightforward in its application and, until recently, it had been thought to give more consistent results than the willingness-to-pay approach. Consequently the human capital approach has been used in all past Australian studies of road accident costs. The BTCE (1992) used this approach in its estimates of the costs of

Australian road accidents for 1988. Implicit in these results is a value of human life of \$616,000 (in 1992 dollars).<sup>1</sup>

#### **2.4.2 Disadvantages of the human capital approach**

There are, however, several criticisms of the human capital approach to valuing human life. In different studies the dependence of earnings on age, sex and employment status have been taken into account in different ways. Other aspects of the approach which have been subject to debate include whether gross output or net output of expected lifetime consumption is the appropriate measure, whether income or earnings should be used as the measure of output and whether, and how, to value non-market output such as family, home and community work.

Another criticism of this method is that it estimates the value of potential production lost and therefore overestimates the actual loss to society. Given that short-term absences from work may be covered by others or made up on return to work, and long-term absences may be covered by someone drawn from the ranks of the unemployed, absences from work may cost the individual or their employer, but cost society very little (Drummond, 1992). Consequently, the human capital approach will overestimate indirect costs in an economy with less than full employment. In such cases, the emerging **friction cost method** may provide a better estimate of the impact of production loss to society but this approach requires further development (Koopmanschap, 1994). While this method may better determine the actual loss of production, it is not capable of determining the societal burden of injury.

Conversely, because its valuation of human life is based on market earnings, the human capital approach yields low values for children and retired elderly persons. Many injury victims fall into these categories. The human capital approach also undervalues life if labour market imperfections exist and wages do not reflect true abilities. For example, women and minorities are often paid wages that are lower than the value of what they produce (Rice et al., 1989).

Certain dimensions of illness and death, such as pain, suffering and reduced quality of life, are also ignored. The human capital approach, does not accurately reflect the way people value their own or others' lives. Most people value safety more out of an aversion to injury or death than out of a wish to preserve future levels of income (Jones-Lee, 1990). Other approaches to the costing of illness and injury, such as the willingness-to-pay method, incorporate not only the loss of income but also the human costs such as reduced quality of life and pain and suffering.

### **2.5 THE WILLINGNESS TO PAY APPROACH**

The willingness-to-pay approach values human life according to the amount individuals are willing to pay for a change that reduces the probability of illness or death (Schelling, 1968). This approach assumes an individual perspective and incorporates all aspects of well-being, including labour and non-labour income, and the value of leisure, pain and suffering.

People regularly express their valuation of risk and safety through their purchases of safety equipment or their acceptance of higher wages (danger money) for dangerous jobs. Such behaviour can be interpreted as implying a value of life which can be determined by (hedonic pricing) analyses of the amounts paid, or accepted as compensation, for changes in exposure to risk. Alternatively, similar information can be obtained (through contingent valuation surveys)

---

<sup>1</sup> The estimate assumed a discount rate of 7 percent per year, productivity improvements of 2 percent per year, and included both foregone earnings and family and community losses.



about more precisely specified situations, by asking people how much they would be willing to pay to avoid different levels of risk.

Value of life determined on the willingness to pay to reduce risk is generally much higher than from the human capital approach. Miller (1989) assessed 49 studies and concluded that 29 of them were reasonably sound in methodology. Miller and Guria (1991) reported that range of the results from these studies was from \$1.3 to \$4.8 million with a mean of \$2.8 million (in 1992 Australian dollars).

There is only one study using Australian data from which the value of life based on willingness to pay can be estimated. Kniesner and Leeth (1991) examined wage differentials in manufacturing industry in 1984-85, and related these to fatality rates in a hedonic pricing study. They found that workers exposed to the mean fatality risk (1.4 fatalities per 10,000 workers per year) received a premium \$701 per year compared to workers in a completely safe industrial setting. According to RCG/Hagler Bailey (1994) this can be interpreted as implying a value per statistical life of \$5.0 million (in 1991-92 Australian dollars).

### **2.5.1 Advantages of the willingness-to-pay approach**

The willingness to pay approach is now generally accepted by economists as theoretically the most valid approach to valuing life, and preferable to the human capital approach. Based on the findings of a willingness to pay survey carried out in 1989-90 (Miller & Guria, 1991), the New Zealand Ministry of Transport decided that the value of statistical life should be \$NZ 2 million at 1 April, 1991 prices and that it should be indexed to the average ordinary wage rate. Guria (1993) subsequently prepared social cost estimates of traffic injuries by severity, based on the willingness to pay approach, for use by the New Zealand Land Transport Safety Authority in the economic evaluation of safety programs and policies.

Currently in the European Union, the United Kingdom, Sweden, Switzerland, Finland and, to some extent, Denmark use the willingness to pay method for valuing transport fatalities. In the UK willingness-to-pay is also used for valuing non-fatal serious injuries (European Transport Safety Council, 1997). The Office of the US Secretary of Transportation (BTCE, 1994) has also adopted this method, more than doubling the previous estimates of the value of life. According to Miller, willingness-to-pay estimates of the value of life are also used by other government agencies in the US such as the Nuclear Regulatory Commission, the Consumer Product Safety Commission, the Occupational Safety & Health Administration, the Environmental Protection Agency and the Department of Agriculture (Miller & Guria, 1991).

### **2.5.2 Disadvantages of the willingness-to-pay approach**

Determining the value of life by the willingness to pay method inherits the strengths and weaknesses of hedonic pricing and contingent evaluation. In addition there are a number of unsettled methodological issues relating to such matters as the ability of people to make informed decisions about small risks, the perception of risk, and whether valuations should be augmented to reflect willingness to pay for someone else's safety. However, the overriding objection to the willingness-to-pay method is that it requires substantial development prior to implementation, thereby limiting efforts to apply it (Rice et al., 1989). Consequently, it has not been used to date in any injury costing studies in Australia.

## **2.6 WHICH APPROACH?**

There is a major debate within the cost-of injury literature regarding the most appropriate methodology for the determining the indirect cost of injury.

While there is dispute about the way productivity losses are measured, there are also ethical objections to its inclusion in costing studies. If the relative economic burden of injury or disease includes productivity losses, and this data is used as the sole determinant for priority setting, then more resources will be devoted to the care of people of working age or of certain occupations. This does not sit well with the notion of equity in health-care (Drummond, 1992). The most recent version of the Australian guidelines for the economic evaluation of pharmaceuticals suggests that results should be presented both with, and without, indirect benefits and costs included, but emphasises that the value of work time gained and lost should be made explicit (Henry, 1992).

While recognising the limitations of the human capital approach, it is still considered the most appropriate methodology for this study given the availability and reliability of data, the possibility of comparison with other studies particularly in the road trauma area (eg. BTCE, 1992) and the difficulty of applying other approaches given their current state of development.

It must be recognised, however, that the human capital approach results in much smaller estimates of the value of life, compared with the willingness to pay approach. This can have a very substantial impact on subsequent benefits/cost analysis and this major issue should not be overlooked in policy decisions. Economic losses to society may be approximated by lost productivity however, the discounted future earnings figure arrived at by the human capital approach generally underestimates the total perceived loss to the individual. Human capital estimates represent the absolute lower boundary of willingness-to-pay estimates, but may only be within a factor of 2 or 3 (perhaps even 5 or 10) of what a person or his/her family feel they actually lose if death or permanent disablement occur as a result of injury (Hartunian, Smart & Thompson, 1975).

Since the willingness-to-pay approach to valuing indirect cost is becoming more common, estimates of this cost in relation to injury in Victoria are provided in Chapter 8 for reference purposes. Little work has been done in Australia to develop appropriate estimates. Consequently, the figures presented here have been derived from estimates established in overseas studies.

## **2.7 THE COST OF INJURY IN AUSTRALIA**

Although the cost of injury imposes an enormous burden on society little has been published on the total economic cost of injury in Australia. A 1986 figure of \$11 billion per year is still quoted as the best available estimate (Better Health Commission, 1986) of the total cost of the burden of injury to Australia.

At least two studies have developed estimates of the direct treatment cost of injury in Australia. A study by Monash University Accident Research Centre (Watson and Ozanne-Smith, 1995) estimated that the treatment costs associated with unintentional injury alone (excluding medical misadventure and the adverse effects of prescription drugs) amounted to \$1.79 billion for Australia in 1992-93. This study relied on a "bottom-up" approach using injury surveillance data and individual service costs.

Recent estimates by the Australian Institute of Health and Welfare suggest that the direct treatment cost for all injury (intentional and unintentional) accounted for around \$2.6 billion dollars in 1993-94 (Mathers, Penm, Carter & Stevenson, 1997). This study was based on a "top-down" approach and estimated the direct cost of health services by taking known recurrent expenditures on health services from the national accounts and apportioning them to disease categories (on the basis of the ICD-9 CM chapters) using data on utilisation of health services by disease type and costs per service. A comparison between different causes of illness in this

study showed that injury ranks fourth behind circulatory, musculo-skeletal and mental disorders in terms of direct health care costs (Mathers, Penm, Carter & Stevenson, 1997).

However, direct treatment costs account for only a proportion of the total cost of injury. In the US, the total lifetime cost of injuries incurred in 1985 was estimated to be \$US 158 billion. The direct cost of injury (includes all medical care costs and selected non-medical costs) accounted for 29% of the lifetime cost of injury, while indirect costs such as morbidity costs (the value of goods and services not produced because of injury-related illness and disability) and mortality costs (losses due to premature death) accounted for 41% and 30% respectively of the total (Rice, MacKenzie & Associates, 1989).

While the 1986 figure of \$11 billion per year is still quoted as the best available estimate of the total cost of the burden of injury to Australia (Better Health Commission, 1986), the cost of road accidents alone was estimated at \$6.1 billion for Australia in 1993 (BTCE, 1994). Estimates by the Industry Commission (1995) of the total cost of workplace injury for 1992-93 was \$20 billion. While these estimates vary in the type of costs included, it is clear that the total cost of injury to Australia is considerable.



### **3. METHODOLOGY**

#### **3.1 INCIDENCE ESTIMATION AND DATA SOURCES**

Fundamental to developing estimates of the economic cost of injury are data on incidence by major age, sex and cause categories. Estimates of the numbers and rates of injury are presented in this report for three mutually exclusive groups that broadly reflect the severity of injury : (1) injury resulting in death, (2) injury resulting in hospitalisation with survival to discharge, and (3) injury requiring medical attention without hospitalisation. Injuries for which medical attention was not sought have been excluded from this study since there is no data available on the frequency of such cases. Estimates of incidence and economic cost reported here are for the financial year 1993/94, the most recent year for which reliable incidence data for each level of injury severity were available.

Within each level of severity (fatal, hospitalised and non-hospitalised), incidence estimates were developed for each of seven age groups (0-4, 5-14, 15-24, 25-44, 45-64, 65-74 and 75 years and over), two gender groups and thirteen categories of cause based on the major ICD-9 categories : ten unintentional (motor vehicle traffic, other transport, drowning, poisoning, falls, fire & flames, hit/struck/crushed, cutting, asphyxia and other) and two intentional (self-harm and interpersonal violence), and unknown intent.

Because important segments such as sporting, home and workplace injuries are concealed by the ICD-9 disaggregation, incidence estimates for each level of injury severity were also developed for the settings in which injury events occur and the activity being undertaken at the time of injury. The eleven setting categories are : manufacturing, commercial, transport, sporting, recreational, residential, institutional, educational, farming, other specified and unspecified settings. Eleven activity categories were also defined. These are : sport, leisure, paid work, other work/household activities, education, personal activities/care, transportation, self-harm, interpersonal violence, other specified activities and unspecified activities.

##### **3.1.1 Data Sources**

The major data sources used in estimating the number of injuries that occurred in Victoria in 1993/94 were the Victorian Coroners Facilitation System (VCFS) for deaths, the Victorian Inpatient Minimum Dataset (VIMD) for live hospital discharges and the Victorian Emergency Minimum Dataset (VEMD) and the Extended Latrobe Valley Injury Surveillance (ELVIS) for less severe, non-hospitalised injuries. These were supplemented by information from the National Injury Surveillance Unit (NISU) for doctor certified deaths and the Victorian Injury Surveillance System (VISS) for non-hospitalised injury. Some minor to moderately severe injury may not present to hospitals or general practitioners. For example, some injuries, particularly musculo-skeletal injuries, generally present to sports medicine or workplace clinics or may present directly to allied health practitioners such as chiropractors, osteopaths or physiotherapists. Such cases have been excluded from this study since there is no data available on the frequency of these attendances. This will result in an underestimation of costs.

The completeness and validity of injury data are fundamentally important to the accuracy of cost of injury estimates. While some checks were possible within this study, not all data could be validated. Comparison of information between databases often results in more questions than answers since reconciliation of any discrepancies requires more resources than were available to this study.

Age- and gender-specific estimates for the 1993 Victorian resident population are used in calculating rates of injury per 100,000. The resident population estimates at 30/6/93 (Australian Bureau of Statistics, 1993) are included in Appendix Table C1.

### 3.1.2 Methods

#### 3.1.2.1 Deaths

The main source of data for determining the number of injury deaths is the Victorian Coroners Facilitation System (VCFS), a record of all unnatural deaths occurring in Victoria which the State Coroner has investigated and for which a finding has been recorded. An injury death is defined as any death with an underlying cause of injury as defined by the Ninth Revision of the International Classification of Diseases (ICD-9 CM, Commission on Professional and Hospital Activities, 1986), E-codes 800-999 excluding E870-E879 (misadventures to patients during surgical and medical care) and E930-E949 (drugs, medical and biological substances causing adverse effects in therapeutic use). This definition includes all traumatic injuries, burns, poisonings and drownings (see Appendix Table A1). It should be noted that deaths with injury noted only as a contributing factor and not as the underlying cause are excluded from the definition.

To establish incidence, the date of the injury event, rather than the date of death, is the preferred criterion for inclusion. In extracting data from the VCFS, cases were included in the analysis on the basis of date of injury (occurring in the base year 1993/94). However, VCFS data is currently only available for deaths occurring up to, and including June 30, 1994. No hard data is currently available on the number of deaths occurring in later years due to injuries inflicted in 1993/94. These were estimated using percentages derived from Max, Rice and MacKenzie (1990).

The dataset also does not include cases for which the Coroner had not determined a finding at the time the data were released. Around 5 percent of cases for this period were still awaiting a finding. These are published in *Unnatural Deaths 1993/94*<sup>2</sup> by cause and intent. To determine the numbers in age and gender groups the distribution from the VCFS database was applied and the estimated number of cases in each age and gender group was then added to the deaths in the database. Around 10 percent of injury deaths, mainly cases of elderly falls victims, (which the Coroner is not required to investigate) are certified by doctors. Information on these cases was provided by NISU from death certificate data collected by the Australian Bureau of Statistics. These cases are included on the basis of date of death, because NISU does not hold data on the date of injury.

It has been clear for some time that the recording of falls deaths is problematic. While the addition of NISU/ABS doctor certified deaths to the Coronial data provides a more complete picture, a comparison with hospital data contained in the VIMD suggests that the number of deaths in patients who had sustained a fall may be twice that officially recorded. However, the problem lies in attributing death to the fall. Because falls often occur in the elderly and may result in long hospitalisation, complications of existing conditions and co-morbidity, death may not or can not be officially attributed to the fall. Because of the problems associated with attribution, only those deaths officially attributed to injury have been used in this study and therefore the costs derived maybe underestimated. Restricting the definitions to deaths with an

---

<sup>2</sup> Table CRN 4.5, p. 253, *Unnatural Deaths, collated from the findings of the State Coroner, 1993/94*. State Coroner's Office, Victoria.

underlying cause of injury underestimates the total number of injury-related deaths, especially among the elderly and particularly in relation to falls. However, since it is difficult to ascribe the death in these cases to the injury per se, the more conservative definition is used.

In view of the suspected large number of deaths which may have been ignored, there would be considerable merit in a further study to estimate the number of these cases.

### ***3.1.2.2 Hospitalisations***

The incidence of hospitalised injury cases was derived from the Victorian Inpatient Minimum Dataset (VIMD). The VIMD is a prevalence-based collection which records all separations from all Victorian public and private hospitals. Monash University Accident Research Centre (MUARC) holds a subset of the VIMD containing information about all injury hospitalisations in the State.

For the purpose of this study an injury-related hospitalisation was defined as a live discharge (therefore deaths in hospital are excluded) with an injury cause code between E800 and E999 excluding medical misadventure (E870-E879) and the adverse effects of pharmaceuticals in therapeutic use (E930-E949). Cases were selected if admission occurred in the base year (1993/94), the assumption being that admission date is a reliable surrogate for date of injury. Selecting injury admissions in the VIMD solely on this basis however, overestimates the incidence of injury resulting in hospitalisation. This occurs for several reasons.

First, re-admissions of a patient to the same hospital for the same external cause of injury will be counted twice. Such cases are identifiable because they have the same encrypted admission number, postcode, E-code gender and date of birth. Almost five percent of injury cases (3,692) were re-admissions to the same hospital within 30 days. These were excluded from the count of injury hospitalisations.

Transfers from one hospital to another will also be counted twice. Although it is not possible to link transfers in the VIMD because patient identification has been removed, a more realistic estimate of the actual incidence of hospitalisations due to injury in the base year can be obtained by excluding those patients where the admission source is identified as the same<sup>3</sup> or another hospital. A further five percent (3,584) of the remaining cases were excluded on this basis.

Another potentially important source of overestimation is the inclusion of cases who are re-hospitalised for follow-up care of a previous injury (which may not have occurred in the base year or may occur more than 30 days after the initial admission). There is presently no way of accurately identifying these cases since, with patient identifiers removed, there is no reliable way of linking episodes of care for individual patients. Hospitalisations classified by principal diagnosis as “traumatic complications” (N958) or “late effects” of injury (N905-N909) may fall into this group. However, an analysis of the 1993/94 data showed that “traumatic complications” of injury accounted for less than 0.3 percent of the 67,402 injury hospitalisations while there were no cases of “late effects” of injury recorded.

Since hospitalised injuries are known to account for the greatest proportion of the direct cost of injury (Rice et al., 1989, p.50), these injuries were further disaggregated by nature and body region of injury to provide greater accuracy in assigning costs between causes. Injury data,

---

<sup>3</sup> Internal transfers are recorded when a change of care type occurs (eg when a patient is moved from an acute care ward to nursing home-type care or a rehabilitation unit within the same hospital).

however, is currently collected differently by different sectors in Victoria. Thus, although the occupational injury database of the WorkCover authority is a rich source of outcome and cost data, its lack of ICD coding created a problem for this study. A mapping process was conducted to overcome this difficulty based on nature of injury and body part so that costs derived from WorkCover data could be applied more sensitively to the available hospitalised injury data. A 13 X 11 matrix of nature of injury by body region was developed based on the ICD-9 CM diagnosis codes for injury (N800-N999) to map onto a similar matrix developed for WorkCover payments data. To develop costings across each injury cause, age and gender group required the generation of 182 matrices (one for each age-group x gender x injury cause cell in the summary tables). An example of the matrix is provided in Appendix Table B3 (overall incidence of injury hospitalisations).

### ***Long-term disability***

An estimate of the number of totally and permanently incapacitated (TPI) injury cases in Victoria in 1993/94 was derived by applying the percentage of TPI cases in the WorkCover database to cases of working age in the VIMD using the injury matrix.

### ***Nursing home admissions***

The number of patients who were admitted to nursing homes following an injury event resulting in hospitalisation was derived from the VIMD. Only those patients who were admitted to hospital, but who were not institutionalised prior to injury, were included in the incidence figure. It is likely that there were nursing home admissions, especially among the elderly, following non-hospitalised injury events, but there are no data on which to base an estimate.

### ***Spinal cord injury***

The incidence of spinal cord injury resulting in paraplegia and quadriplegia was estimated to provide costings for these major areas of ongoing cost. Data on the age, gender and cause distribution of traumatic spinal cord injury in Victoria for 1996 were provided by Victorian Spinal Cord Services at the Austin and Repatriation Medical Centre.

### ***3.1.2.3 Non-hospitalised cases***

Estimates of the number of minor injuries resulting in medical attention without hospitalisation are derived from several sources and consist of two components : hospital Emergency Department presentations and General Practitioner attendances.

#### ***Emergency Department presentations***

The number of non-hospitalised injury cases presenting to Emergency Departments in Victoria in 1993/94 was estimated using the number of hospital admissions from Emergency Departments recorded in the VIMD as the basis for calculation. This figure was multiplied by the admissions to presentations ratio derived from 1996 data from a sample of 24 Victorian hospitals covered by the Victorian Emergency Minimum Dataset (VEMD). The total estimate was then broken down into injury cause categories, age and gender, setting and activity groups using the distributions in the 1996 VEMD presentations data. A comparison of motor vehicle traffic injury attendances at Victorian Emergency Departments established in this study with an estimate of road injury attendances in 1990/91(O'Connor & KPMG Peat Marwick, 1993) shows similar figures. (26,584 cases estimated in this study for 1993/94 compared to 23,991 in 1990/91).



### *General practitioner attendances*

There is no statewide database that collects information regarding General Practitioner (GP) attendances. However, information about injuries treated by GPs in the Latrobe Valley was collected for a twelve-month period (7/11/94 to 6/11/95) through the Extended Latrobe Valley Injury Surveillance (ELVIS) system. Information about Emergency Department attendances was collected concurrently by the Victorian Injury Surveillance System through the Emergency Departments of the Latrobe Regional Hospital. The ratio of general practice to Emergency Department attendances in the Latrobe Valley is estimated to be 1.2 : 1 (Day, Valuri & Ozanne-Smith, 1997, p. 17). This ratio is similar to the 1:1 ratio determined by McClure & Ozanne-Smith (1996) in a study of the epidemiology of injury in the Australian Capital Territory in 1992. By applying a median point between these two studies of 1.1 : 1, the number of injury-related, non-hospitalised GP attendances for Victoria in 1993/94, was derived from the estimated number of Emergency Department attendances. The total number of non-hospitalised GP attendances was then distributed between injury cause, age, gender, setting and activity groups on the basis of the distributions observed in the ELVIS data.

It should be noted that the Latrobe Valley may not be representative of the rest of Victoria given that the majority of the population reside in Melbourne. However, it is currently the only data available on GP attendances for injury in a Victorian population. As identified by that study (Day, Valuri & Ozanne-Smith 1997), injured persons in the Latrobe Valley were more likely to attend a G.P. rather than a hospital because: they preferred to see a doctor they knew (32%), the injury was not severe enough to attend hospital (25%), the G.P. was closer to home than the hospital (14%) or the waiting time was shorter than the hospital (12%). However, patients transported from the scene of an accident by ambulance, irrespective of the severity of the injury, will always be conveyed to a hospital Emergency Department.

#### *3.1.2.4 Setting and activity at time of injury*

Data from the VCFS for 1993/94 were used to establish injury setting and activity at time of injury fatalities.

Because ICD-9 CM does not categorise injuries into many important settings such as sport, work, school, farm and so on, the VIMD does not provide detail of the setting, or activity being undertaken at the time of injury that results in hospitalisation. Thus indirect means were required to identify the proportion of cases occurring in these settings. Estimates of the number of hospitalised injuries for each setting or activity group were established by applying proportions derived from admitted patients recorded in the VEMD in 1996. Although the WorkCover data is known to represent an underestimate of the total number of hospitalised workplace injuries<sup>4</sup>, the number of cases injured at work was taken directly from the WorkCover data as this was the best data available (given the large proportion of cases of unknown and unspecified activity in the VEMD).

Data from the VEMD and ELVIS were used to establish an estimate of the number of cases for each setting and activity category attending hospital Emergency Departments and general practitioners which were combined to provide the total estimates of non-hospitalised cases in each category

---

<sup>4</sup> WorkCover does not include self-employed persons (such as small businessmen and farmers) and large employers who are self-insured.

### 3.2 COST ESTIMATION METHODS AND DATA SOURCES

This study follows the work of the Rice et al. (1989) and the Bureau of Transport and Communication Economics (BTCE, 1992) in that it uses the ex-post human capital approach to estimate the indirect costs associated with injury, by assigning an economic value to the loss of life and productive capacity resulting from injury. The total cost estimated using this method depends on the cost elements taken into account and how these elements are calculated.

In contrast to the BTCE (1992), which used the accident as the basic costing unit, in this study the basic costing unit is the injured person. The framework for estimating the total cost in this study consists of costs relating to the treatment of injury (direct costs), costs relating to the loss, or partial loss, to society of the productive efforts (both paid and unpaid) of injury victims and care-givers in the case of children (indirect costs).

Direct costs are the actual expenditure related to the injury and include medical and non-medical costs such as hospital (inpatient and Emergency Department), medical (general & specialist services) and rehabilitation (rehabilitation services, aids and equipment) costs associated with the treatment of injury. Other direct costs include ambulance transport, pharmaceuticals and treatment by health professionals other than medical doctors. They may also include the cost of caring for an injured person at home such as attendant care or visits by a nursing service. No attempt was made to value the services of family and friends (beyond the productive loss to care-givers of child injury victims) who care for the injured, because of the lack of data available in relation to this area. However, this 'informal care' cost is likely to be significant as indicated by case studies included in the study by Rice et al (1989).

Legal costs and property damage are excluded because they are costs associated with the injury event rather than the injury itself and information about these costs is not available for all causes of injury. That is, the costs are injured person- rather than event- or accident-based. While data for property damage, for example, is probably available for road traffic accidents and house fires in Victoria, it is not available for other injury events. As indicated by the BTCE (1992) study, property damage can account for a significant proportion of the total cost of an injury event (30 percent).

Indirect costs represent the value of lost output due to reduced productivity caused by injury and any resultant disability (morbidity) and losses due to premature death (mortality). Loss or partial loss of future production has been estimated in terms of earnings and labour on-costs of injury victims, the productive but unpaid contribution of victims to their households and communities and the productive time lost by caregivers of child injury victims. Compensation costs relating to pain and suffering have not been included.

The aforementioned factors comprise the framework for the estimation of injury-related costs. The estimate of the total cost of injury to Victoria in 1993/94 has been generated from the actual or estimated incidence of injury in that year. The estimates will therefore be affected by the accuracy or otherwise of these data. Costs are estimated for three levels of injury severity : fatalities, hospitalised injuries and non-hospitalised injuries. It is reasonable to expect that injury data becomes less reliable as the degree of injury severity decreases since many moderate to minor injuries are self-treated or treated by allied health professionals. As mentioned in the previous chapter, such cases are not identified in the current injury surveillance systems. While the individual cost of such injuries will generally be small, their number is likely to be large and therefore their aggregate cost substantial, resulting in an under-estimation of the total cost of injury.

### 3.2.1 Data sources

In this study payments data have been used as surrogates for resource costs. This approach is commonly used in the cost-of-illness literature (Rice et al., 1989). It is recognised, however, that due to market imperfections in the health sector, payments may not reflect costs completely accurately.

Comprehensive payment data (on deaths, hospitalised and non-hospitalised cases) has been provided for this study by the Victorian WorkCover Authority (VWA) and the Transport Accident Commission (TAC). Contained in their databases is information about a range of direct costs including hospital, medical, allied health and rehabilitation treatment as well as attendant care, and ambulance, etc. Information about income support, lump sum payments and long term outcomes is also available. All payments made by these authorities to December 31, 1996 in relation to transport accident and occupational injuries that occurred in 1993/94 have been included in the average costs used for each payment category in this study. While there will still be further costs incurred for those cases which have resulted in permanent or long-term disability, it is assumed that the major part of treatment costs have been incurred during this period.

Very little work has been done in Australia on the long-term cost of injury. For the purpose of this study an estimate of the direct treatment costs for severe spinal cord injury, for which incidence and cost data is available, has been included. An estimate of nursing home costs (based on discharges to nursing homes from acute care hospitals) has also been included in the hospitalisation costs. Morbidity cost estimates for hospitalised patients include those for totally and permanently incapacitated persons, severe spinal cord injury as well as nursing home admissions (adjustments being made to avoid double-counting).

For non-hospitalised injury cases, the cost data supplied by the TAC and the VWA were supplemented by information about service fees from the Health Insurance Commission's *Medicare & Pharmaceutical Benefits Statistical Tables*.

Data used in establishing lost production values have been derived from Australian Bureau of Statistics publications, on-line information service and from the BTCE (1992) study on the cost of transport accidents in Australia.

An outline of the estimation procedure for each cost element, for each level of injury severity, is detailed in the following sections.

## 3.2.2 Methods

### 3.2.2.1 Deaths

The cost of fatal injury consists of direct cost and mortality cost. All injury fatalities are included in this category and not in the hospitalised and non-hospitalised categories.

#### *Direct costs*

Because of the small number of injury-related death claims in the WorkCover database, the average cost of a motor vehicle traffic death (from the TAC) was been applied to all 1993/94 deaths to provide an estimate of the direct costs (medical and non-medical) associated with injuries resulting in death. These costs include : ambulance transport, hospital (inpatient and Emergency Department), medical (general and specialist), pharmaceuticals, allied health, rehabilitation (programs and equipment), personal and domestic assistance, etc. The same estimates were conservatively applied to later year deaths with the hospital component being adjusted to reflect greater length of stay (based on the average length of stay of later year deaths recorded in the VIMD). Applying the same treatment costs and using length of stay data only to 1995/96 will result in an underestimate of total direct costs for fatalities.

#### *Mortality cost*

The mortality cost, or the value of foregone productivity due to early death, was also estimated. In addition to the deaths that occurred in the base year, 1993/94, a number of deaths occurred in later years due to injuries sustained in that year.

Mortality cost is the value of lost productivity resulting from injury deaths, calculated as the product of the number of injury-caused deaths and the present value of future production. Estimates of the value of future production by age and gender were derived from tables provided in the BTCE (1992) study adjusted by the annual CPI rise to reflect 1993 values<sup>5</sup> (see Appendix Table D1). These values represent both paid and unpaid production components.

This estimate of paid production (lifetime earnings) was derived from median weekly earnings for full-time employees in their main job plus labour on-costs of 21.2 percent. Earnings specific to age and gender were then applied to the number of years remaining in the labour force as a discounted (7 percent discount rate) earnings stream and adjusted for annual productivity gains (2 percent per annum) over the relevant period to produce an estimate of lost production at present values (1993/94). These figures were further adjusted to take into account the varying labour force participation rates for each age and gender group.

A large amount of unpaid household and voluntary community work is performed by both employed and non-employed persons. When a person dies or is incapacitated this production is also foregone and represents a social cost. The BTCE (1992) used the opportunity cost approach in valuing the unpaid production component of their estimates of the value of future production. This method assumes that the worker has given up paid work in order to perform unpaid work and hence household and community work is valued in terms of earnings foregone, as measured by median weekly earnings by age and gender. The value of foregone family and community work was calculated using the working life tables. The hours of unpaid work were converted to

---

<sup>5</sup> Method used by BTCE to adjust values for application in later years (personal communication, Joe Motha, BTCE)

an annual wage and added to the age and gender specific calculation of foregone earnings during working and retired life to produce the total value of future production.

### **3.2.2.2 Hospitalisations**

The cost of hospitalised injury consists of direct cost and morbidity cost. This category represents only live patient discharges. Injured persons who die in hospital are included in the deaths category.

#### ***Direct Cost***

Treatment payment data for motor vehicle traffic injuries was supplied by the Victorian Transport Accident Commission (TAC). This data consisted of the direct treatment and related costs of 5,374 persons hospitalised due to motor vehicle traffic accidents in Victoria in 1993/94 by age-group and type of payment.

Costs for all other injury causes were derived from payment data supplied by the Victorian WorkCover Authority (VWA) in the form of a matrix of body part by nature of injury. This data consisted of the direct treatment and related costs for 6,717 workers injured in Victoria in 1993/94 by payment type. While the reliability of the average cost derived for some cells is low, due to the small number of cases, because of the variability of injury types that occurs in different age and cause categories, applying costs on the basis of this matrix allows for greater discrimination between injury causes and age-groups than does applying a blanket average to all cases

Matrices of injury incidence were derived from the VIMD for each of the 7 age-groups in each of the 13 injury cause groups. These were multiplied by the matrix of average costs for each payment type to establish a total cost for each cell in the age by gender by cause tables provided here. Where there were no payments in the WorkCover data for a particular injury type, the average cost for the relevant body part or nature of injury was applied. A medical excess of \$378 applied to all VWA and TAC cases in 1993/94 and this cost was added to each case to arrive at the final costing.

#### ***Nursing home admissions***

Nursing home admissions as a result of injury were identified in the VIMD. Only those cases which were not admitted from a nursing home were included. The annual cost of nursing home care in 1996/97 was supplied by the Commonwealth Department of Health and Family Services<sup>6</sup>. This figure was discounted by the annual CPI increase to provide an estimate of the annual cost in 1993/94. Life expectancy to age 75 was assumed to have been reduced by a factor of 2 as a result of trauma. This may be an overestimation but no data is currently available on life expectancy of trauma-related nursing home admissions. This cost was then applied to all cases on the basis of estimated life years remaining, discounted at 7 percent per annum to obtain 1993/94 values. Because 40 percent of elderly nursing home residents die within the first six months<sup>7</sup> of admission, all cases aged seventy-five years and over (almost 80 percent of cases admitted from hospital) were ascribed only six months of nursing home costs.

---

<sup>6</sup> personal communication, John Patrone, Commonwealth Dept. of Health & Family Services.

## *Spinal cord injury*

No data is available on the incidence of persisting spinal cord injury (SCI) from traumatic causes in Victoria in 1993/94. However, trend data published in a recent issue of the Australian Injury Prevention Bulletin (O'Connor & Cripps, 1997), indicate that annual age-adjusted incidence rates for Australia have not varied significantly between 1986-90 and 1995-6. Therefore, the incidence of traumatic persisting SCI in Victoria in 1996 was used as the basis for estimating the lifetime treatment costs of SCI from injuries incurred in 1993/94. These data were supplied by the Victorian Spinal Cord Services at the Austin & Repatriation Medical Centre. Treatment cost estimates for severe spinal injury from a study by Walsh (1988), adjusted by the annual CPI rise to reflect 1993/94 prices. Given that the life expectancy of people with SCI now approaches that of the general population (Whiteneck et al, 1992), annual ongoing direct costs were applied to each case on the basis of life years remaining to age 75 years, discounted at 7 percent per annum to reflect 1993/94 prices.

## ***Morbidity***

While an injured person is hospitalised or unable to perform their normal activities, productive capacity is lost to the community. Comprehensive information on the length of the period of total or partial disability as a result of injury is not available. In keeping with other studies, the length of stay in hospital has been used as the basis for estimating the period over which productive capacity is lost or reduced. While the BTCE (1992) assumed only one additional day of production lost for each day in hospital, its calculations are based on an average of 21 hospital bed-days estimated from TAC data for the base year 1988. Data from the VIMD, however, show that in 1993/94, the average length of stay was only 8 days for a motor vehicle traffic injury. While this may indicate some degree of over-counting of cases in the VIMD, because of the difficulty in linking episodes of care for individual patients, dividing the number of bed-days associated with motor vehicle traffic injuries (50,437) by the number of hospitalised TAC claimants in that year (5,374) still results in an average length of stay of only 9 days. Because of this discrepancy and the effect it would have on the total estimates (effectively reducing the total morbidity by a factor of 2.5 in comparison to the BTCE's study), this study follows the work of Collins and Lapsley (1991) in assigning two additional days of lost production for each day of hospitalisation.

The earnings estimates used in this study for each age and gender were derived from earnings from full-time employees in their main jobs. The figures used were based on median weekly earnings (ABS, 1994a) plus labour on-costs of 21.2 percent. The estimates take into account the labour force participation rate for each age and gender group (ABS, 1994b) assuming that the distribution of injury victims is similar to that of the population at large in terms of employment. For cases of unknown age and/or gender, the average lost earnings of victims of known age and gender were applied.

Separate calculations were made to estimate the paid production loss of care-givers of children under 15 years of age. These figures were based on the median wages and work-force participation rates of women with children in this age range since women primarily undertake this role.

A large amount of productive but unpaid work is performed by both employed and non-employed persons. This includes household work and voluntary community work. When a person is incapacitated this production is also lost to the community. Following the BTCE (1992), this study uses the opportunity cost approach to value unpaid production. It is assumed that the median weekly earnings by age and gender best describes the opportunity cost of performing

household and community work. Therefore the value of unpaid production time lost is assumed to be equal that of production time lost in paid work.

An estimate of the average time spent on labour force activities in a week by males and females was calculated from figures published by the Australian Bureau of Statistics (1994c). Time spent on unpaid household and community work was taken from the 1992 Time Use Survey conducted by the ABS (1994d). Figures derived from the same sources were also used to calculate the value of unpaid production lost by unemployed victims of injury.

Separate calculations, based on the BTCE (1992) working life tables, were undertaken for victims of spinal cord injury, total and permanent incapacitation and nursing home admissions. Information about the labour force participation of persons with paraplegia and quadriplegia in Victoria (Murphy et al., 1997) was used to adjust the loss of earnings estimates for this group.

Further information regarding morbidity calculations and the formulae used to estimate both paid and unpaid production are detailed in Appendix E.

### *3.2.2.3 Non-hospitalised cases*

The cost of non-hospitalised injury consists of direct treatment costs and morbidity costs associated with lost earnings.

#### *Direct Costs*

Because a medical excess of \$378 applied to all TAC and VWA cases in 1993/94 on top of the average costs of \$1,921 and \$1,200 respectively, it was apparent the cases in these databases represented the more severe end of the non-hospitalised injury spectrum. The TAC and VWA payments for non-hospitalised injuries were therefore not typical of the majority of cases at this level of severity and therefore could not be applied to all cases.

Information on the distribution of the first, and one subsequent visit (or referral), to the Emergency Department or General Practitioner, as a result of injury, was available from the VEMD and ELVIS. This data represents the minimum number of medical attendances for injury in Victoria. Each visit was costed using service costs derived from Jackson, Sevil, Tate & Collard (1995), the Health Insurance Commission (1993-94) and the Royal Australian College of General Practitioners<sup>7</sup>. The proportion of Medicare bulk-billing was taken into account when costing General Practitioner and specialist attendances (Health Insurance Commission, 1994, Table 9).

The average cost of a non-hospitalised injury derived from the TAC and the VWA was conservatively applied to 38.7 percent of specialist referrals<sup>8</sup> since these cases were assumed to represent the more serious end of the spectrum of severity for non-hospitalised cases. (An additional \$378 was applied to each case to take into account the medical excess).

#### *Morbidity*

---

<sup>7</sup> Australian Medical Association recommended fees provided by the Royal Australian College of General Practitioners.

<sup>8</sup> The number of non-hospitalised TAC cases as a proportion of the total number of non-hospitalised motor vehicle traffic injuries. It is also estimated that WorkCover (VWA) cases account for almost 40 percent of non-hospitalised, work-related injury.

Following the BTCE (1992), only one day of lost earnings was ascribed to each case of non-hospitalised injury. Average daily earnings for each age and gender were derived from the weekly earnings of full-time employees in their main jobs. As described in the hospitalisation section (3.2.2.2), the figures used were based on median weekly earnings (ABS, 1994a) plus labour on-costs of 21.2 percent. The estimates take into account the labour force participation rate for each age and gender group (ABS, 1994b) assuming that the distribution of injury victims is similar to that of the population at large in terms of employment. For cases of unknown age and/or gender, the average lost earnings of victims of known age and gender were applied. Paid lost production was also estimated for care-givers of injured children aged under 15 years. Unpaid production losses were also derived in the manner described in Section 3.2.2.2 and applied on the same basis.

#### ***3.2.2.4 Setting and activity at time of injury***

The cost assigned to each setting or activity category was derived on the basis of the proportion of the number of cases in each category. However, where the category definitions coincide with ICD-9 cause groups, the estimates have been taken directly from those groups and adjustments were then made to the remaining groups to arrive at the known totals. For example, self-harm and interpersonal violence exist as categories in both the ICD-9 classification and the activity coding. In the case of transportation activities, the estimates for the ICD-9 cause groups “motor vehicle traffic” and “other transport” have been added together and a deduction made for the proportion of work-related injuries (known or estimated from WorkCover data) included in these categories.



## 4. STRENGTHS AND LIMITATIONS OF THE STUDY

### 4.1 LIMITATIONS

While the original aim of this study was to provide an estimate of the total economic cost of injury to the Victorian community, it became clear, in the process of developing the methodology, that any costing exercise is dependant entirely on the availability and quality of both incidence and cost data. Consequently, this study, as with most costing exercises in this area, can provide only a partial estimate of the total economic cost, due to the limitations of the available data.

The cost estimates developed in this study utilise the best available data for developing an estimate of the cost of injury to Victoria. However, several qualifications (most of which are discussed in the preceding chapters on methodology), should be highlighted.

The incidence estimates are likely to be an underestimate, particularly at the less severe level of non-hospitalised injury because current injury surveillance systems do not pick up important areas of primary care, other than Emergency Departments and general practitioners, such as sports medicine clinics, workplace clinics and allied health professionals such as physiotherapists and chiropractors. The number of deaths associated with falls is also known to be an underestimate.

Several known costs are excluded because data are unavailable. No attempt was made to value the services of family and friends (beyond the productive loss to care-givers of child injury victims) who care for the injured, because of the lack of data available in relation to this area. However, this 'informal care' cost is likely to be significant as indicated by case studies included in the study by Rice et al (1989).

Similarly, costs associated with the injury event (such as property damage), rather than the injury itself, have been excluded on conceptual and practical grounds. Conceptually, the focus of the study is the costs generated by the injury itself, rather than the precipitating event. Practically, data relating to such costs is just not available for all types of injury events. It should be noted, however, that these costs can account for a major part of the cost of an injury event. These costs, as indicated by the BTCE reports (1990,1992) can be quite considerable.

There are no estimates of the long-term treatment costs (beyond the first 3-4 years) associated with the majority of severely injured cases, because there is no data available except for those with spinal cord injury. Severely injured persons may be institutionalised and an attempt has been made to capture this cost in estimating the lifetime cost of nursing home care. However, there is no data available relating to the ongoing costs associated with medical and other treatment.

Morbidity costs associated with non-hospitalised injury are likely to be an underestimate because of the conservative measure used and the fact that some non-hospitalised injury (eg back injury) can result in long-term disability.

No attempt has been made to capture the cost of pain and suffering (except as it is reflected in the willingness-to-pay estimates provided in Chapter 8).

## 4.2 STRENGTHS

Overall, it can be assumed that the estimates presented in this study represent the lower limit of the true lifetime cost of injury in Victoria. As better cost data become available and, with the ongoing progress in the quality of injury surveillance data, refinements and improvements to the approach used here can be made. However, the estimates presented here are based on the best data available at the present time.

Because of the controversy about the relevance of including indirect costs and because the different components fall within different sectors of the economy, this study reports the direct and indirect costs separately, as well as the total amount. The separate components of the direct costs have also been identified as this may help policy makers and other interested parties identify the sectors on which the major burden falls. An attempt has also been made to identify the major sources of payment for the various types of direct cost incurred (see Chapter 7).

Because the study is incidence-based, the estimates contained herein represent the current care, or 'do nothing' option, and therefore can provide a baseline against which new interventions can be assessed.

Finally, while the primary focus of this study is the economic cost of injury to Victoria, in the process of developing these costs, an extensive description of the epidemiology of injury in Victoria has been produced (see chapter 5). This represents the first comprehensive epidemiology of injury study published for Victoria and provides information about the frequency, rates, causes and severity of injury as well as disaggregations based on age, gender, activity at time of injury and location of injury event. This data provides an important adjunct to the cost data presented in Chapter 6.

## **5. THE INCIDENCE OF INJURY**

### **5.1 OVERVIEW**

In Victoria in 1993/94, injuries resulted in at least 1,487 deaths (with an estimated further 142 deaths occurring in later years as a result of injuries sustained in that year), 67,402 persons hospitalised, and an estimated 397,160 non-hospitalised medically treated injured persons in Victoria in 1993/94 (Table 5-1). In total, over 446,000 people were injured or 10.5 persons injured per year for every 100 Victorian residents (the estimated resident population of Victoria by age and sex is shown in Appendix Table B1). Just over one in 10 persons in this State, in a year, sustain an injury that requires at least an attendance at a hospital Emergency Department or a general practitioner's surgery. Many of these injuries are fatal or serious enough to require hospitalisation and are associated with long-term disability.

Of the total 466,049 persons injured in Victoria in 1993/94, almost 30 percent (134,543) occurred in the 25-44 year age-group (who account for 31 percent of the Victorian population). Persons aged 15-24 comprise almost 16 percent of the Victorian population yet account for more than 20 percent (103,704) of all injuries. While children under the age of 15 account for 21 percent of the total Victorian population, they comprise almost 30 percent of the total injured population (about 131,500 injuries). Overall, persons aged under 45 years sustain almost 80 percent of all injuries.

The risk of injury is higher among males who sustain almost 62 percent of all injuries yet account for only 49.5 percent of the population. Almost 13 percent of Victorian males incur injuries, whereas for females the risk is lower with about 8 percent sustaining an injury in a year. Among both males and females the largest number of injuries occurs in the 25-44 year age-group. The risk of injury is highest, however, for younger males with more than one in five (or 20 percent of) males aged 15-24 sustaining an injury during a single year. Overall, the leading cause of injury death in Victoria is suicide, followed by motor vehicle accidents, whereas falls are the leading cause of hospitalisation and of all non-fatal injury.

Most injuries occur in the home (36 percent) followed by areas of sport and recreation (12.5 percent) then areas of transport (11.7 percent). In terms of activity being undertaken at the time of injury, most injuries were associated with sport and leisure activities (40.2 percent) followed by work-related injury (11 percent) the transportation injuries (10.8 percent).

### **5.2 AGE AND GENDER PATTERNS**

The largest number of injuries of each level of severity is among males. Almost three-quarters (72.5%) of injury deaths and over three-fifths (61.5%) of non-fatal injuries occur among males (Table 5-1 and Figure 5-1).

It should be noted when comparing the number of cases within age groupings that the size of the groups vary. This has been done to reflect the natural groupings that injury prevention researchers, practitioners and policy-makers are interested in, for example : pre-schoolers (0-4 years), children (5-14 years), young adults (15-24 years) and so on. It also reflects the groupings of, and allows for comparison with, the major US cost of injury study by Rice et al. (1989). However, care should be exercised when making comparisons, between age-groupings which contain disparate ranges. These should be based on rates.

Although adults aged 25-44 years have the greatest number of injuries overall, they are not over-represented in the injury data. This age-group represents 31 percent of the total Victorian population and account for a similar percentage of all injuries (29 percent). They account for 29 percent of deaths due to injury, 27 percent of injury hospitalisations and 29 percent of less

severely injured, non-hospitalised persons. However, young people aged 15-24 account for approximately 16 percent of the Victorian population yet comprise 22 percent of the total population of injured persons. Young people in this age-group account for 20 percent of both injury fatalities and hospitalisations and 23 percent of non-hospitalised injuries. Children aged 5-14 are also over-represented as injury victims, accounting for 14 percent of the Victorian population yet comprising 19 percent of all injury cases. Children in this age-group, however, tend to have less severe injuries overall accounting for 20 percent of non-hospitalised cases but only 12 percent of hospitalisations and 2 percent of deaths (Figure 5-2). Overall, children in the 0-4 age-group are also slightly over-represented in the injury data accounting for 7 percent of the total population but just over 9 percent of all injuries. Again, this over-representation occurs at the less severe end of the spectrum accounting for almost 10 percent of non-hospitalised injuries, but only 6 percent of hospitalised cases and 2 percent of deaths. The disparities in age-groupings should be taken into account when interpreting Table 5-1 and Figure 5-2.

Unlike other leading causes of death and hospitalisation (such as cancer and heart disease), nearly 80 percent of the injuries resulting in death or hospitalisation occur among persons less than 65 years of age, with nearly two-thirds occurring among persons less than 45 years of age.

The risk, or rate, of injury presents a slightly different picture (Figures 5-3, 5-4 and 5-5). Although the number of deaths and hospitalisations due to injury for the elderly aged 75 years and above are lower than the number in the three younger age-groups (15-24, 25-44 and 45-64), the risk of both death and hospitalisation as a result of injury is highest for the elderly aged 75 and older (115 and 4,483 per 100,000 Victorian residents for deaths and hospitalisations, respectively). The elderly aged 75 years and over comprise less than 5 percent of the Victorian population yet account for over 14 percent of all injuries resulting in death or hospitalisation. Young people aged 15-24 rank second in the risk of injury severe enough to result in death or hospitalisation (42 and 1,908 per 100,000 respectively). The death rate for injury is lowest among children aged 5-14 years (4.5 per 100,000) while the hospitalisation rate for injury is lowest among adults aged 45-64 years (1,055 per 100,000 population).

Patterns of injury by age are considerably different for less severe injuries not resulting in hospitalisation. The elderly aged 75 and older have a comparatively low risk of non-hospitalised injury (5,593 per 100,000 population). Children aged 5-14, young people aged 15-24 and children aged 0-4 have the highest risk of minor injury (12,916; 12,870 and 12,197 per 100,000 respectively).

The risk of injury also varies by gender within each level of injury severity. In every age group except the very young (0-4 years) and the elderly (75 years and older), the injury death rate for males is more than twice that of females. In contrast, males are only 1.7 times as likely as females to sustain a non-fatal injury. Among adults aged 65 years and over, females are almost one and a half times as likely as males to suffer a non-fatal injury.

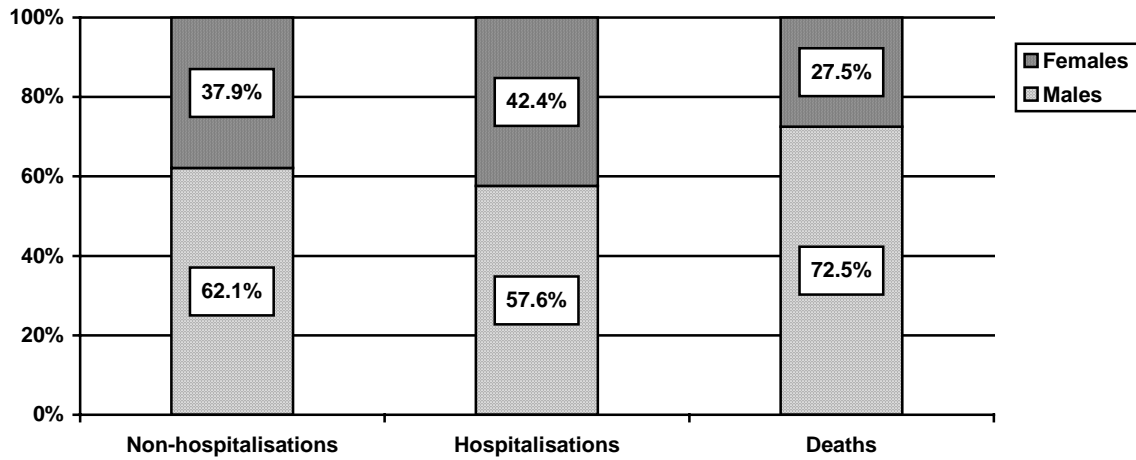
**Table 5-1 : Number and rate of injured persons by sex, age, and injury severity, Victoria, 1993/94**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>466,049</b>	<b>10,445</b>	<b>1,487</b>	<b>33.33</b>	<b>67,402</b>	<b>1,511</b>	<b>397,160</b>	<b>8,901</b>
0-4	43,451	13,531	26	8.10	4,256	1,325	39,169	12,197
5-14	88,057	14,174	28	4.51	7,786	1,253	80,243	12,916
15-24	103,704	14,820	292	41.73	13,352	1,908	90,060	12,870
25-44	134,543	9,675	443	31.86	18,134	1,304	115,966	8,340
45-64	54,783	6,114	320	35.71	9,457	1,055	45,006	5,022
65-74	17,958	5,633	131	41.09	4,797	1,505	13,030	4,087
75+	21,853	10,192	247	115.19	9,613	4,483	11,993	5,593
Missing	1,699				7		1,692	
<b>Male</b>	<b>286,742</b>	<b>12,973</b>	<b>1,078</b>	<b>48.77</b>	<b>38,839</b>	<b>1,757</b>	<b>246,825</b>	<b>11,167</b>
0-4	24,539	14,898	15	9.11	2,509	1,523	22,015	13,366
5-14	52,353	16,446	19	5.97	4,985	1,566	47,349	14,874
15-24	72,098	20,241	237	66.54	9,528	2,675	62,333	17,500
25-44	91,064	13,160	343	49.57	12,171	1,759	78,550	11,352
45-64	31,818	7,046	249	55.14	5,500	1,218	26,069	5,773
65-74	7,589	5,134	86	58.18	1,873	1,267	5,630	3,808
75+	6,237	7,829	129	161.94	2,269	2,848	3,839	4,819
Missing	1,043				4		1,039	
<b>Female</b>	<b>179,307</b>	<b>7,963</b>	<b>409</b>	<b>18.16</b>	<b>28,563</b>	<b>1,268</b>	<b>150,335</b>	<b>6,676</b>
0-4	18,912	12,091	11	7.03	1,747	1,117	17,154	10,967
5-14	35,704	11,786	9	2.97	2,801	925	32,894	10,858
15-24	31,606	9,199	55	16.01	3,824	1,113	27,727	8,070
25-44	43,480	6,224	100	14.31	5,963	854	37,417	5,356
45-64	22,965	5,166	71	15.97	3,957	890	18,937	4,260
65-74	10,369	6,064	45	26.32	2,924	1,710	7,400	4,328
75+	15,616	11,588	118	87.56	7,344	5,450	8,154	6,051
Missing	656				3		653	

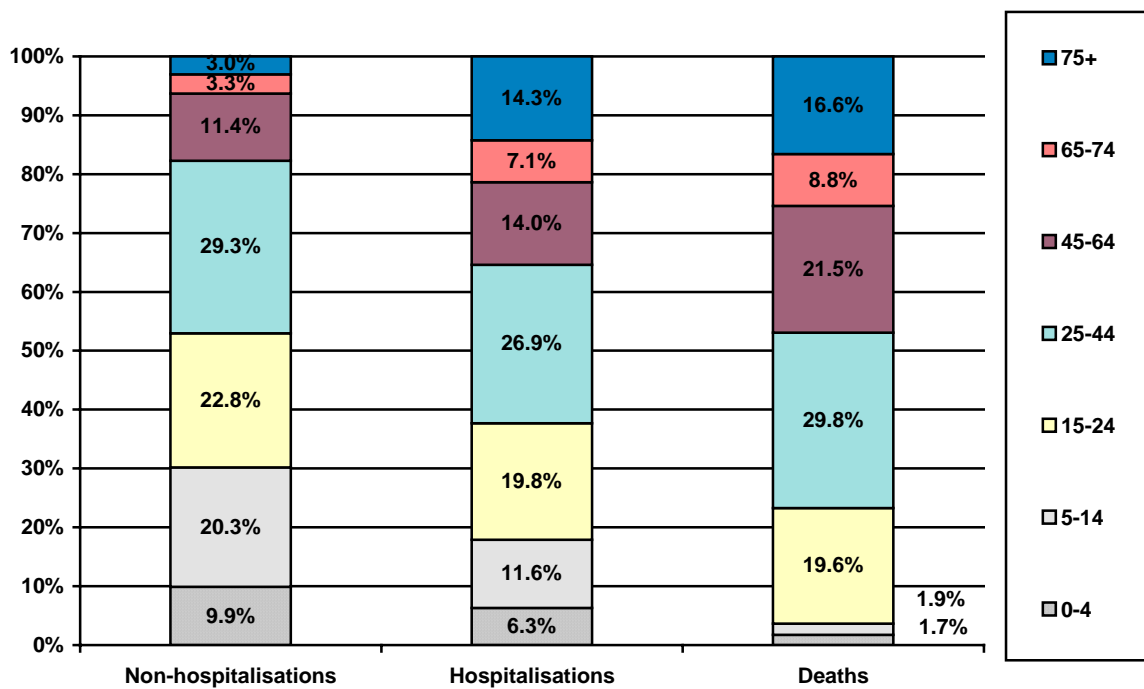
• Excludes an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993/94.

• NOTE : Care should be exercised when comparing frequencies within non-equivalent age-groups.

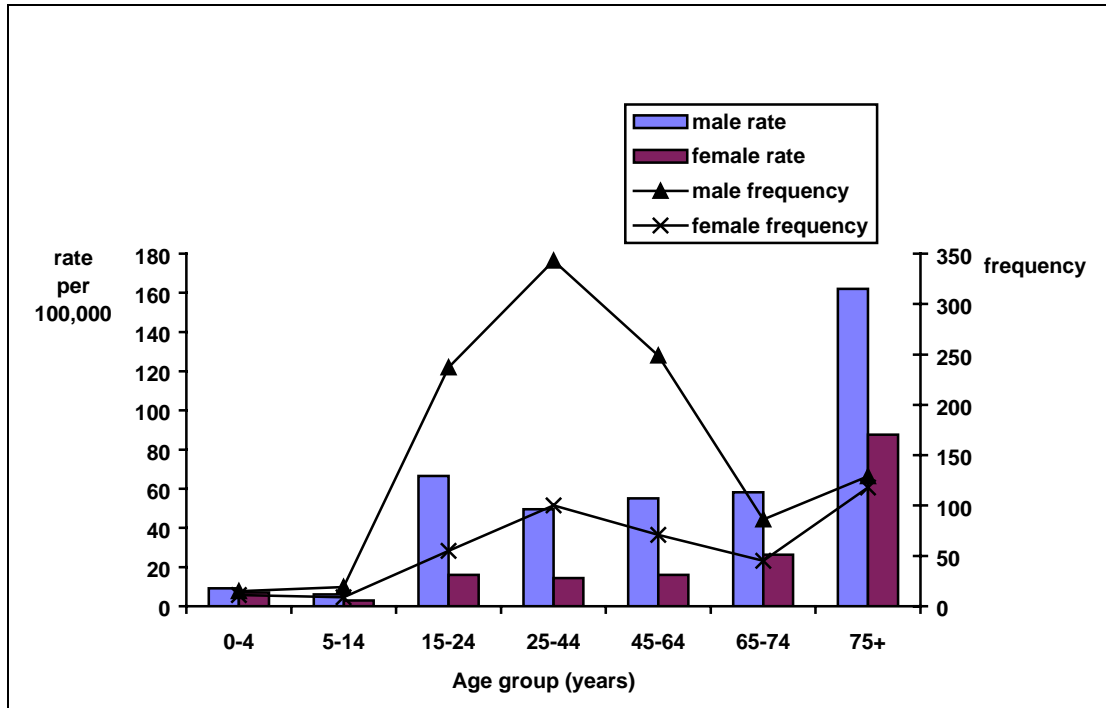
**Figure 5-1 : Distribution of injured persons by gender and severity of injury, 1993/94**



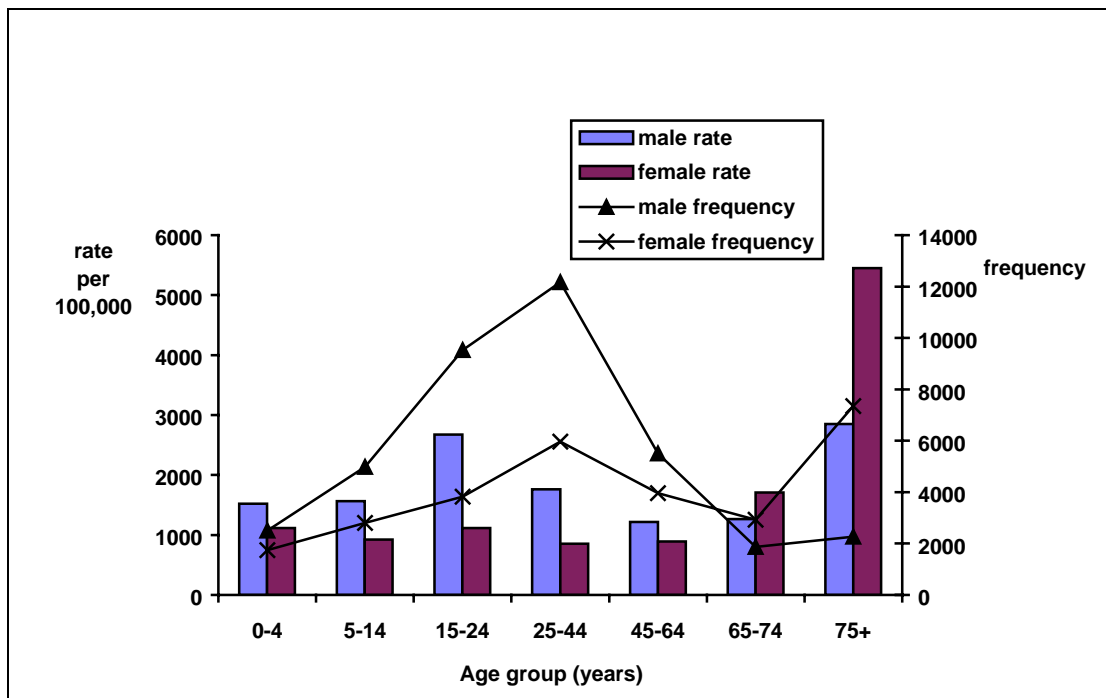
**Figure 5-2: Distribution of injured persons by age and severity of injury, 1993/94**



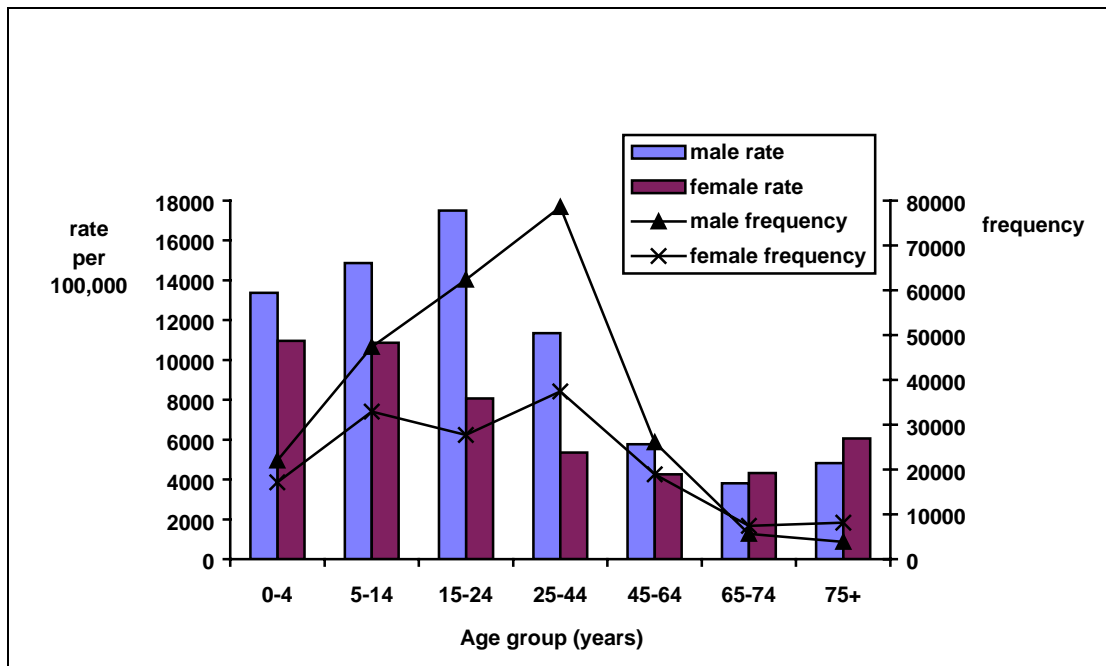
*Figure 5-3 Number of injury deaths and injury death rates by age-group and gender*



*Figure 5-4 Number of hospitalised injuries and hospitalised injury rates by age-group and gender*



**Figure 5-5 Number of non-hospitalised injuries and non-hospitalised injury rates by age-group and gender**



### 5.3 CAUSE OF INJURY

The distribution of injury by cause varies for deaths, hospitalisations and non-hospitalisations as shown in Table 5-2 and Figure 5-6. The numbers and rates for each cause of injury by age and gender are shown in Appendix Tables C5-C17.

The leading causes of injury death in Victoria are suicide and motor vehicle traffic accidents. They account for 527 and 441 deaths respectively (11.8 and 9.9 per 100,000 population respectively). Together these two causes account for 65 percent of all injury deaths. In contrast, the leading cause of non-fatal injury is falls which account for over 23,000 hospitalisations and over 105,000 non-hospitalised injured persons. Hitting, striking or crushing and motor vehicle traffic accidents are the next most likely causes of injury hospitalisation (6,412 and 6,120 cases respectively) while hitting, striking or crushing and cutting and piercing are the next most likely causes of non-hospitalised injury (81,044 and 43,581 cases respectively). Motor vehicle accidents are the fourth leading cause of non-hospitalised injury accounting for 26,584 injured persons. Self-harm or attempted suicide, on the other hand, account for only 1.7 percent of all non-fatal injury. These differences in distribution by cause and injury severity highlight the lethal nature of injuries involving intentional self-harm and motor vehicles. The rank order of cause varies by age representing exposure and life stage factors (Watt, 1995). (see Appendix Tables C2-C4).

Injuries categorised as “Other” include a variety of causes (see Appendix Table A1 for category definitions). For deaths, other causes include machinery (13), electrocutions (6), firearms (2) and unspecified (17) and represent just 2.5 percent of all injury deaths. Non-fatal injuries resulting from other causes are mainly those related to foreign bodies, machinery, dog bites and other unspecified causes and comprise 20 percent of all hospitalised injury cases. For less severe non-hospitalised injury, additional common causes categorised as “other” include animal and insect bites and over-exertion, and comprise 22 percent of non-hospitalised injuries.



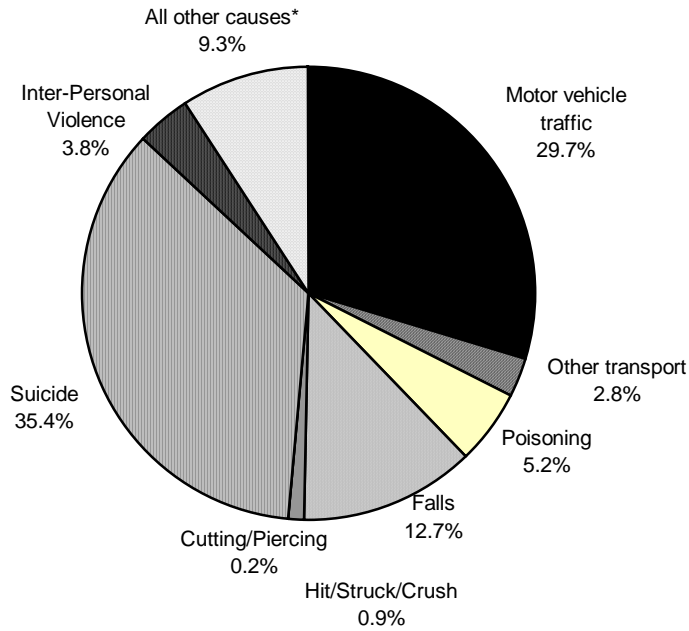
**Table 5-2: Number and rate of injured persons by cause of injury and injury severity, Victoria, 1993/94.**

Cause of injury	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>466,049</b>	<b>10,445</b>	<b>1,487</b>	<b>33.33</b>	<b>67,402</b>	<b>1,511</b>	<b>397,160</b>	<b>8,901</b>
Motor vehicle traffic	33,145	743	441	9.88	6,120	137	26,584	596
Other transport	17,775	398	41	0.92	3,089	69	14,645	328
Drowning	315	7	39	0.87	74	2	202	5
Poisoning	10,555	237	77	1.73	2,761	62	7,717	173
Falls	128,553	2,881	189	4.24	23,161	519	105,203	2,358
Fire/flames/burns	10,359	232	30	0.67	926	21	9,403	211
Hit/struck/crush	87,470	1,960	14	0.31	6,412	144	81,044	1,816
Cutting/piercing	47,324	1,061	3	0.07	3,740	84	43,581	977
Asphyxia	692	16	20	0.45	225	5	447	10
Other	99,454	2,229	38	0.85	13,776	309	85,640	1,919
Suicide	8,295	186	527	11.81	3,891	87	3,877	87
IPV	20,877	468	57	1.28	2,859	64	17,961	403
Unknown intent	1,235	28	11	0.25	368	8	856	19
<b>Male</b>	<b>286,742</b>	<b>12,973</b>	<b>1078</b>	<b>48.77</b>	<b>38,839</b>	<b>1,757</b>	<b>246,825</b>	<b>11,167</b>
Motor vehicle traffic	19,126	865	323	14.61	3,750	170	15,053	681
Other transport	10,781	488	35	1.58	1,966	89	8,870	397
Drowning	256	12	28	1.27	50	2	178	8
Poisoning	5,752	260	50	2.26	1,391	63	4,311	195
Falls	64,831	2,933	99	4.48	10,177	460	54,555	2,468
Fire/flames/burns	5,982	271	18	0.81	606	27	5,358	242
Hit/struck/crush	61,643	2,789	14	0.63	4,969	225	56,660	2,563
Cutting/piercing	31,793	1,438	3	0.14	2,779	126	29,011	1,313
Asphyxia	382	17	14	0.63	120	5	248	11
Other	65,803	2,977	33	1.49	8,971	406	56,799	2,570
Suicide	3,853	174	416	18.82	1,569	71	1,868	85
IPV	15,743	712	37	1.67	2,280	103	13,426	607
Unknown intent	797	36	8	0.36	211	10	578	26
<b>Female</b>	<b>179,307</b>	<b>7,963</b>	<b>409</b>	<b>18.16</b>	<b>28,563</b>	<b>1,268</b>	<b>150,335</b>	<b>6,676</b>
Motor vehicle traffic	14,019	623	118	5.24	2,370	105	11,531	512
Other transport	6,994	311	6	0.27	1,123	50	5,865	260
Drowning	59	3	11	0.49	24	1	24	1
Poisoning	4,804	213	27	1.20	1,370	61	3,407	151
Falls	63,722	2,830	90	4.00	12,984	577	50,648	2,249
Fire/flames/burns	4,377	194	12	0.53	320	14	4,045	180
Hit/struck/crush	25,827	1,147	0	0.00	1,443	64	24,384	1,083
Cutting/piercing	15,532	690	0	0.00	961	43	14,571	647
Asphyxia	310	14	6	0.27	105	5	199	9
Other	33,650	1,494	5	0.22	4,805	213	28,840	1,281
Suicide	4,442	197	111	4.93	2,322	103	2,009	89
IPV	5,133	228	20	0.89	579	26	4,534	201
Unknown intent	438	19	3	0.13	157	7	278	12

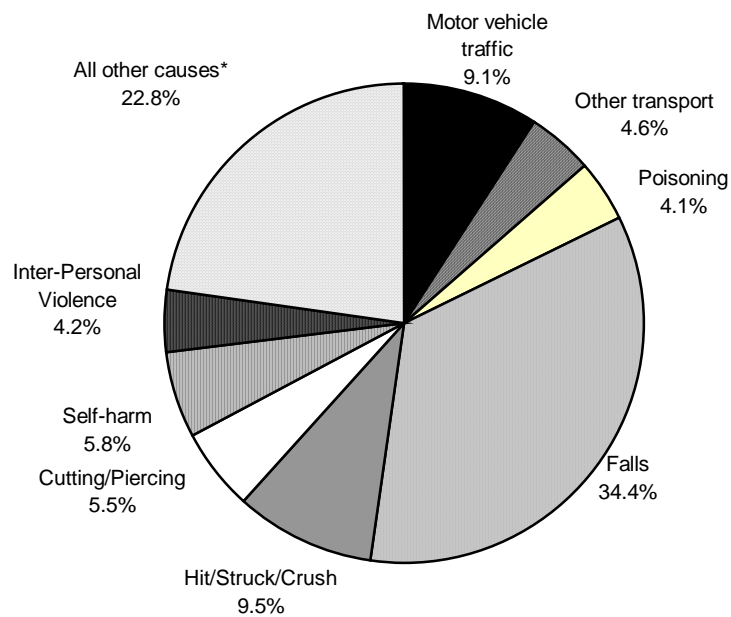
• Excludes an estimated 142 later year deaths from injuries incurred in 1993/94)

**Figure 5-6: Distribution of injured persons by cause and severity of injury, 1993/94.**

**Deaths**

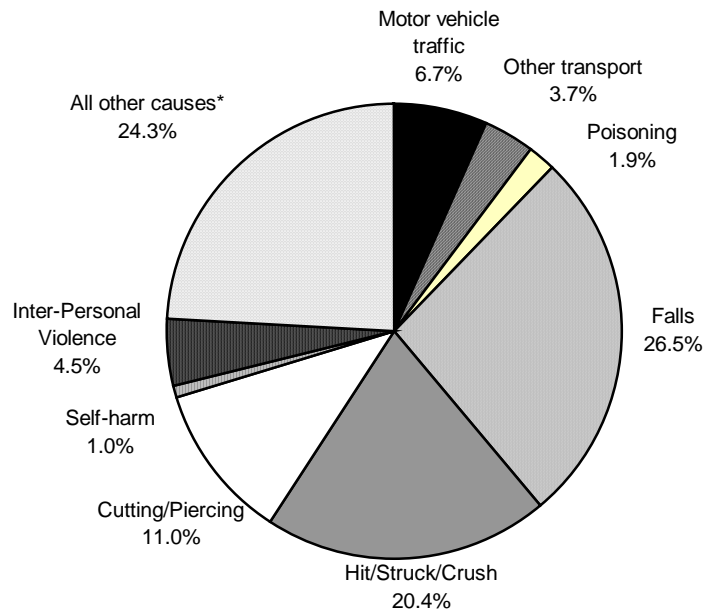


**Hospital admissions**



\* All other causes includes: Drowning, Fire/flame/burns, Asphyxia, Other unintentional, Unknown intent.

### Non-Hospitalised persons.



\* All other causes includes: Drowning, Fire/flame/burns, Asphyxia, Other unintentional, Unknown intent.

#### 5.4 INTENT OF INJURY

Just over 40 percent of all injury deaths involve intentional injuries (Table 5-3 and Figure 5-7). Of the intentional injury deaths that occurred in 1993/94 in Victoria, 88.5 percent were suicides (527) and 9.5 percent homicides (57). The remaining 60 percent of injury deaths were due to unintentional causes mainly motor vehicles (49 percent) and falls (21 percent).. However, this is an under-representation of the true death rate from falls (see Section 3.7.1 Deaths).

Intentional injury was the cause of only about 10 percent of all injury hospitalisations. Of these, almost 55 percent were self-inflicted and 40 percent were due to interpersonal violence. Of the remaining 90 percent of unintentional injury hospitalisations, almost 40 percent were due to falls. At the least severe end of the injury spectrum, it is estimated that only about 6 percent of non-hospitalised cases were intentionally caused. Of these, the majority were due to interpersonal violence (79 percent).

In terms of injury rates, males are 3.5 times more likely to die from intentional injury than females due mainly to the significantly higher rate of suicide deaths among males (18.82 per 100,000 population compared to 4.93 for females). Whereas females are almost 1.5 times more likely than males to be hospitalised for attempted suicide, males are almost 4 times as likely to be hospitalised for interpersonal violence (see Appendix Tables C12 & C13).

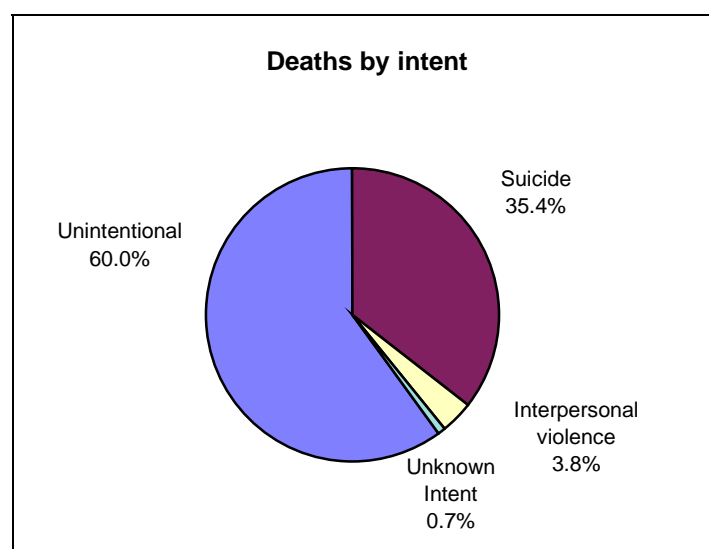
**Table 5-3: Number and rate of injured persons by intent and severity of injury, Victoria, 1993/94.**

Intent	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>466,049</b>	<b>10,445</b>	<b>1,487</b>	<b>33.33</b>	<b>67,402</b>	<b>1,511</b>	<b>397,160</b>	<b>8,901</b>
Unintentional	435,643	9,763	892	20	60,284	1,351	374,467	8,392
Intentional	29,172	654	584	13	6,750	151	21,838	489
Unknown	1,235	28	11	0.25	368	8	856	19
<b>Male</b>	<b>286,742</b>	<b>12,973</b>	<b>1,078</b>	<b>48.77</b>	<b>38,839</b>	<b>1,757</b>	<b>246,825</b>	<b>11,167</b>
Unintentional	286,742	12,973	617	28	34,779	1,574	230,952	10,449
Intentional	19,596	887	453	20	3,849	174	15,294	692
Unknown	797	36	8	0.4	211	10	578	26
<b>Female</b>	<b>179,307</b>	<b>7,963</b>	<b>409</b>	<b>18.16</b>	<b>28,563</b>	<b>1,268</b>	<b>150,335</b>	<b>6,676</b>
Unintentional	169,294	7,518	275	12	25,505	1,133	143,514	6,373
Intentional	9,575	425	131	6	2,901	129	6,543	291
Unknown	438	19	3	0.1	157	7	278	12

\* Excludes an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993/94.

NOTE: Totals may not sum due to rounding errors.

**Figure 5-7: Fatalities by intent, Victoria, 1993/94**



## 5.5 HOSPITALISED INJURIES BY BODY REGION AND NATURE OF INJURY

Since hospitalised injuries are known to account for the greatest proportion of the direct cost of injury (Rice et al., 1989, p.50), these injuries have been further distributed by nature and body region of injury to provide greater accuracy in assigning costs between causes. Injury cause groups may include a broad spectrum of injury types and distributing costs on the basis of location and type of injury provides a more sensitive measure of cost between cause groups than applying a blanket average to all cases regardless of location and type of injury.

Injuries to the upper or lower extremities account for nearly 32,500 hospital admissions (17,037 and 15,421 respectively, see Table 5-6) or almost half of all hospitalised injuries. Of these, almost 45 percent are due to falls, 7 percent to motor vehicle accidents and 5 percent to other transport accidents (see Appendix Table B1).

In 1993/94, over 5,800 Victorians survived a head injury serious enough to warrant hospitalisation. Head injury accounts for around 9 percent of all injury hospitalisations. Of these, 75 percent involved intracranial injury (see Table 5-7). Although the majority of these injuries are relatively minor and will fully recover, about 20 percent of cases considered minor may continue to experience problems such as dizziness, headache and fatigue, which could interfere with a successful return to a normal life.<sup>9</sup> The Victorian Major Trauma Study (Cameron et al, 1995) indicated that over 500 admissions are cases of severe head injury (AIS = 3-5), the long-term consequences of which are multiple and profound. Falls are the leading cause of head injury hospitalisations in Victoria, accounting for over a third of cases (1992) in 1993/94 while motor vehicles accidents account for a further 21 percent (1236 cases). Data from the Victorian Major Trauma Study (Cameron et al, 1995) however, show that motor vehicle accidents are the major cause of serious head injury.

Spinal cord injury, although relatively rare (about 80 incident cases annually in Victoria<sup>10</sup>), results in catastrophic physical and psychological changes requiring extensive long-term medical treatment, rehabilitation and extended care. Of the injury cases recorded by the Australian Spinal Cord Injury Surveillance System, almost half were due to motor vehicle accidents (46 percent), with falls (including diving into water) accounting for a further 29 percent<sup>11</sup>.

Fractures account for over a third of all injury hospitalisations (see Table 5-7), the majority of which are caused by falls (61 percent), then motor vehicle accidents (11 percent) or being hit, struck or crushed by an object or person (9 percent) (see Appendix Table B2). Just under 5 percent of all fractures were intentionally inflicted.

Bruising, haematomas and/or crushing injuries account for 9 percent of all injury hospitalisations while poisoning accounts for another 8.3 percent. Of the poisonings, over half were self-inflicted.

---

<sup>9</sup> Kath Howlett (Burgess & Howlett Consulting) cited in "What is the extent of ABI in the community?" *Headway News*, April/May, 1997. Figures drawn from Australian Bureau of Statistics 1993 Survey of Disability, Ageing and Carers.

<sup>10</sup> personal communication, Raymond Cripps, Australian Spinal Cord Injury Surveillance System (ACISS), National Injury Surveillance Unit, Adelaide, 4/6/97.

<sup>11</sup> National Injury Surveillance Unit (1997) Spinal cord injury. *Injury Issues Monitor*, No. 10, March, p.5.

**Table 5-4: Number and rate of injury hospitalisations by body region of injury, Victoria, 1993/94**

<b>Location of injury</b>	<b>Number of live discharges</b>	<b>Rate per 100,000 population</b>	<b>Percent distribution</b>
<b>Total</b>	<b>67,402</b>	<b>1,511</b>	<b>100.0%</b>
Head	5,843	130.94	8.7
Eyes	819	18.35	1.2
Face (excl. eyes)	5,142	115.23	7.6
Neck	1,383	30.99	2.0
Chest	1,672	37.47	2.5
Abdomen/Pelvis	2,949	66.09	4.4
Back (inc. spine)	969	21.71	1.4
Upper Extremity	17,037	381.81	25.3
Lower Extremity	15,421	345.60	22.9
Multiple injuries	192	4.30	0.3
Other/unspecified	15,975	358.01	23.7

**Table 5-5: Number and rate of injury hospitalisations by nature of injury, Victoria, 1993/94.**

<b>Nature of injury</b>	<b>Number of live discharges</b>	<b>Rate per 100,000 population</b>	<b>Percent distribution</b>
<b>Total</b>	<b>67,402</b>	<b>1,511</b>	<b>100.0%</b>
Fractures	23,187	519.64	34.4
Dislocations	2,825	63.31	4.2
Sprains/strains	3,770	84.49	5.6
Intracranial	4,361	97.73	6.5
Internal injury (chest/abdomen)	781	17.50	1.2
Open wound	4,096	91.79	6.1
Superficial injury (inc. foreign body)	699	15.66	1.0
Bruising	6,139	135.34	9.0
Burns	2,761	61.87	4.1
Poisoning	5,613	125.79	8.3
Near drowning	56	1.25	0.1
Asphyxia	86	1.92	0.1
Other/unspecified injuries	13,028	291.97	19.3

## 5.6 INJURY SETTING & ACTIVITY AT TIME OF INJURY

Unlike motor vehicle traffic injuries, major categories including sport, product-related and work injuries are subsumed within the cause categories defined by the ICD-9. An estimate of the incidence of injury that occurs in different settings and during different activities is provided here in an attempt to identify areas of concern that may have been concealed by the ICD-9 disaggregation.

Most injuries occur in the home with 35 percent of all injuries being sustained in a private residential setting (Table 5-6). Injuries that occur in areas of transport are the next most prevalent at 12 percent. Private homes and areas of transport are the most likely setting for injuries of all severities. Together they account for 77 percent of all injury deaths (with 42 percent occurring in the home and 35 percent in transport settings), 58 percent of all hospitalised injuries (43 and 15 percent respectively) and 46 percent of non-hospitalised injuries (35 and 11 percent respectively).

Areas of sport and recreation together account for 12.5 percent of all injuries (9 percent of deaths, 8 percent of hospitalisations and 13 percent of non-hospitalised injury cases).

The educational setting is the next most likely place for injury to occur (8 percent of all injuries). However, injuries in this setting tend to be less severe (accounting for 9 percent of all non-hospitalised cases, 4 percent of hospitalisations and only 0.3 percent of injury deaths).

It should be noted that injury setting does not always equate with activity being undertaken at the time of injury (see Table 5-7). For example, four deaths occurred in areas of sport. However, only one of these was actually involved in a sporting activity at the time of injury. One fell from a ladder and the remaining two were suicides (State Coroner's Office, 1996, Table CRN 2.6). Similarly, while injuries occurring in an educational setting amount to 8.3 percent of all injuries only 0.6 percent of cases were actually involved in an educational activity at the time of injury. Most injuries occur in the playground during recreational breaks. Of the injury deaths recorded in an educational setting, 2 involved drug overdoses and 3 were suicides.

Leisure activities accounted for a third of all injuries (154,078 cases) followed by paid work activities (51,085 cases or 11 percent of the total) and transportation injuries (50,538 or 9.5 percent of all injuries).

In terms of injury severity, self-harm and transportation injuries account for the greatest number of fatalities (35.4 and 30.8 percent respectively of all deaths). Sports and leisure activities account for the greatest number of injury hospitalisations (32.8 percent) followed by transportation (13.5 percent) and work injuries (10.2 percent). Sports and leisure, work and transportation are the most common sources of non-hospitalised injuries (41.5, 11.1 and 10.3 percent respectively).

It should be noted that the large percentage of cases in which injury setting or activity at the time of injury was not specified, missing or invalid in the hospitalised and non-hospitalised data means that the numbers estimated here for each category are likely to be underestimates except where data classified by injury cause could be translated directly to activity (eg transportation, self-harm and interpersonal violence).

**Table 5-6: Number and percentage of injured persons by setting of injury event and injury severity, Victoria, 1993/94.**

Setting of injury event	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Percent of cases	Number	Percent of cases	Number	Percent of cases	Number	Percent of cases
<b>Total</b>	<b>466,049</b>		<b>1,487</b>		<b>67,402</b>		<b>397,160</b>	
Production	19,838	4.2	22	1.5	1,249	1.8	18,568	4.7
Commerce	33,527	7.2	15	1.0	2,667	4.0	30,845	7.8
Farm	7,477	1.6	14	0.9	1,003	1.5	6,460	1.6
Transport	54,653	11.7	522	35.1	10,045	14.9	44,086	11.1
Sporting area	30,533	6.6	4	0.2	1,574	2.3	28,954	7.3
Recreational	27,568	5.9	133	8.9	3,689	5.5	23,746	6.0
Private residential	167,179	35.9	629	42.3	28,903	42.9	137,647	34.7
Institutional	12,098	2.6	101	6.8	2,426	3.6	9,571	2.4
Educational	38,609	8.3	5	0.3	2,462	3.7	36,142	9.1
Other specified	9,734	2.1	0	0.0	2,263	3.4	7,471	1.9
Unspecified	64,831	13.9	42	2.8	11,121	16.5	53,670	13.5

\* Excludes an estimated 142 later year deaths from injuries incurred in 1993/94.

NOTE: Totals may not sum due to rounding errors.

**Table 5-7: Number and percentage of injured persons by activity at time of injury and injury severity, Victoria, 1993/4.**

Activity at time of injury	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Percent of cases	Number	Percent of cases	Number	Percent of cases	Number	Percent of cases
<b>Total</b>	<b>466,049</b>		<b>1,487</b>		<b>67,402</b>		<b>397,160</b>	
Sports	32,891	7.1	1	0.1	2,333	3.5	30,557	7.7
Leisure	154,078	33.1	39	2.6	19,755	29.3	134,284	33.8
Paid work++	51,085	11.0	48	3.2	6,850	10.2	44,187	11.1
Other work/household activities	12,796	2.7	40	2.7	1,447	2.1	11,309	2.8
Education	2,949	0.6	0	0.0	253	0.4	2,696	0.7
Personal activities/care	17,320	3.7	26	1.7	3,738	5.5	13,556	3.4
Transportation #	50,538	10.8	458	30.8	9,076	13.5	41,004	10.3
Self-harm	8,295	1.8	527	35.4	3,891	5.8	3,877	1.0
Interpersonal Violence	20,877	4.5	57	3.8	2,859	4.2	17,961	4.5
Other specified	20,011	4.3	291	19.6	2,719	4.0	17,001	4.3
Other unspecified/missing	95,209	20.4	0	0.0	14,481	21.5	80,728	20.3

• Excludes 142 later year deaths.

# Includes injury causes of motor vehicle traffic accident and other transport and/or motor vehicle non-traffic accidents but excludes work-related injuries.

++ Deaths and hospitalisations were taken directly from WorkCover data. The number of hospitalised cases is known to be an underestimate given that there were an additional 5,554 self-insurer claims reported in 1993/94 (Victorian WorkCover Authority, 1994). However, because no data was available on the severity of these cases (hospitalised or non-hospitalised) they have not been allocated here. It should also be noted that self-employed persons (such as farmers) are not covered under WorkCover.



## 6. THE ECONOMIC COST OF INJURY

Having established the incidence by major age, sex and cause categories, an estimate of the economic cost of injury can be developed by applying relevant costs to incidence data. Estimates of the lifetime cost of injury presented in this report consist of three components : a) direct treatment and related costs; b) morbidity costs and c) mortality costs. Costs are presented by gender, age and cause as well as for three mutually exclusive groups that broadly reflect the severity of injury : (1) injury resulting in death, (2) injury resulting in hospitalisation with survival to discharge, and (3) injury requiring medical attention without hospitalisation<sup>12</sup>. Supplementary estimates for categories of injury concealed by the ICD-9 cause disaggregation are also presented by setting and activity at the time of injury.

Estimates of economic cost reported here are for the financial year 1993/94, the most recent year for which reliable incidence data for each level of injury severity were available. The incidence and lifetime cost estimates for injury in Victoria presented in this report are conservative estimates based on currently available data and commonly used methodologies. This study utilised information from various sources, but in some cases estimates are necessarily made on the basis of limited data and the assumptions, caveats, etc. have been clearly indicated in the text. However, the estimates developed in this study represent the lower boundary of the true cost of injury, but the best estimates based on currently available data.

### 6.1 OVERVIEW

The total lifetime cost of injury for the 466,200 persons who sought medical treatment for injury in Victoria in 1993/94, is estimated at \$2,582.9 million, or an average of \$5,541 per injured person. Direct expenditure for treatment of injury including hospital, medical, pharmaceuticals, rehabilitation, attendant and nursing home care and other services amount to almost \$759 million or \$1,628 per injured person. (Note that average costs are skewed towards the cost of non-hospitalised injury due to the large number of cases in this category).

Disability from injury results in loss of output with individuals generally, unable to attend to their normal activities (eg domestic duties), and members of the labour force, unable to work. In total more than 59,000 life-years (to age 75) are lost (46.5 days per injured person) as a result of injuries sustained in 1993/94, valued at \$1,010.5 million. The morbidity cost amounts to an average of \$2,175 per injured person.

Other losses result from premature injury fatalities. At least 1,487 premature deaths from injury occurred in 1993/94 with an estimated additional 142 deaths occurring in later years as a result of injury sustained in 1993/94. Premature death is extremely costly, amounting to an estimated annual loss of 48,773 life years (to age 75), or 30 years per death. The mortality cost amounts to \$813.5 million at a 7 percent discount rate, or an average cost of \$499,378 per death.

In addition to the reduction in these injured person-based costs, effective injury prevention measures would also provide savings in non-person based costs of injury events such as property damage, fire, police and judicial services, etc.

---

<sup>12</sup> As mentioned previously, injuries for which attention was not sought from either a hospital Emergency Department or a general practitioner have been excluded from this study since there is no data available on the frequency of such cases.

## 6.2 AGE & GENDER PATTERNS

### 6.2.1 Gender

The total lifetime economic cost of injury for males is 1.7 times that of females - \$1,635.2 million compared with \$947.7 million (Table 6-1). The cost per injured person is slightly higher for males - \$5,701 compared with \$5,284 for females.

Males comprise 49.5 percent of the Victorian population, 62 percent of the injured population and account for 63 percent of the total cost. The distribution of lifetime cost by gender varies slightly by type of cost. Males account for almost 58 percent of direct cost, 59 percent of morbidity and 74 percent of mortality (reflecting the higher percentage of male fatalities).

### 6.2.2 Age

Several factors influence costs for each age-group, particularly the number of deaths, life-years lost and earning capacity. It should be noted that the age-range within groups varies and this should be taken into account when making comparisons between age-groups.

While the group aged 25-44 account for 29 percent of all injuries, they comprise 37 percent of the total cost (Figure 6-2). Similarly, persons aged 15-24 account for 22 percent of all injuries and almost 28 percent of the total cost. While the costs are greater for the 25-44 year age-group, it should be noted that this is a 20-year range as opposed to the 10-year range represented by the 15-24 year age-group and represents twice as many persons in the Victorian population (see Appendix Table C1). In fact, the 15-24 year age-group have an injury rate 1.5 times that of the 25-44 year age-group.

Morbidity and mortality costs are highest for the 25-44 year age-group, accounting for 39 percent of morbidity and 44 percent of mortality. Losses for the 15-24 year old age-group are also high accounting for 30 percent of morbidity and 32 percent of mortality costs. Injured persons in these age-group are in the prime of their lives in terms of their productive potential. Many are severely injured and disabled for several years, or for life, and others are fatally injured resulting in substantial losses of productivity (lifetime earnings).

In contrast, the elderly (over 65 years) account for 12 percent of the Victorian population, 8.5 percent of all injuries and 11 percent of the total cost of injury. However, this group accounts for 22 percent of the direct cost of injury and only 9 percent of morbidity losses and 3 percent of mortality cost. Direct costs are high because the elderly generally take longer to recover from trauma than other age-groups, their recovery often hampered by complications and co-morbidities. In contrast, overall morbidity costs and, in particular, mortality costs are low due to their short life expectancy (to age 75), low labour force participation and low earnings.

These issues are highlighted when the cost per injured person is compared across age-groups (see Table 6-1). In contrast to the overall costs, the 65-74 year age-group has the highest average lifetime cost at \$9,607 per person. This consists of the highest per person morbidity cost (\$4,995) because of long periods of recuperation, the second highest average direct (treatment) cost (\$3,333), and the lowest per person mortality cost (\$169,165). While the 15-24 and 25-44 year age-groups have similar per person treatment and morbidity costs, the average mortality cost for the 15-24 year age-group is higher (\$813,852) than that of the 25-44 year group (\$759,569), reflecting the greater number of life years lost per death for this age-group (see Table 8-3).

The distribution by type of cost varies for each age group (Figure 6-3). Direct costs represent the major part of the costs for children and the elderly. In the case of the elderly (65 years and older), the direct costs far outweigh indirect costs - direct, 60 percent; morbidity, 32 percent; and

mortality, 8 percent. The high direct cost for the injured elderly (compared to other cost components) reflects the fact that trauma is often associated with complications and comorbidities in the elderly requiring longer stays in hospital and often long-term admissions to nursing homes.

In contrast, for injured persons aged 15-24, direct costs comprise only 21 percent of total lifetime cost while morbidity and mortality costs represent 43 and 36 percent respectively. The high indirect cost for this age-group reflects their high injury fatality rate, the large number of productive years lost, high labour force participation and high potential lifetime earnings lost.

### 6.3 CAUSE OF INJURY

The distribution of total lifetime cost by cause shows that the greatest losses are caused by motor vehicles traffic accidents and falls, accounting for \$570.5 million and \$557.2 million respectively (Table 6-2). Although the injury rate for falls is higher than for motor vehicle accidents, the significantly higher number of motor vehicle fatalities among young people results in higher lifetime costs. Motor vehicle traffic injuries account for 7 percent of total injuries and 22 percent of total economic costs whereas falls account for almost 28 percent of injuries and 21.5 percent of total lifetime costs (Figure 6-4).

Self-inflicted injury ranks third in economic cost, amounting to \$428.4 million, or 16.5 percent of the total cost. Although self-inflicted injury account for only 1.8 percent of all injuries, fatalities at young ages are high (the suicide rate is highest in the 15-24 year-old age-group), resulting in high costs.

Injuries due to other causes number over 99,000, 21 percent of all injuries, and the total lifetime costs amount to \$318.8 million or 12 percent of the total cost of injury. Included in this category is a variety of injuries including accidental firearm injuries, exposure, foreign bodies and dog bite. For a list of causes of injury included in the 'other' category, see Appendix A.

Distribution by cause of injury varies among the three cost components (ie direct, morbidity and mortality costs), reflecting differing age, gender, medical treatment usage, morbidity and mortality patterns. Figure 6-5 shows the distribution of each cost component by cause of injury. As expected, the mortality cost for injuries with high fatality rates represents a higher proportion of the total than do direct and morbidity costs. For example, 95 percent of the total economic cost of drowning and near drowning is lost lifetime productivity resulting from deaths reflecting the fact that 30 percent of drowning deaths are aged under 5 years (see Appendix Table C7). For falls, which often require lengthy hospitalisation and can result in long-term disability, the direct cost of treatment and the morbidity costs comprise the bulk of the total costs - 47 percent and 48.5 percent respectively. The low mortality cost reflects the fact that the majority of deaths (78 percent) occur in the 75+ years age-group (see Appendix Table C9).

Lifetime costs per person varies for the different causes. Drowning and near-drowning are the highest, amounting to almost \$62,000 per injured person followed by suicide and self-inflicted injury, at \$51,500 per injured person (Table 6-2). The high cost per person is due to the fact that these causes often result in death (rather than hospitalisation or non-hospitalisation), and the victims tend to be young so mortality costs predominate.

Table 6-3 presents the total lifetime cost of injury by cause, age and gender. For most causes of injury, the 25-44 year age-group has the highest total costs followed by the 15-24 year age-group. The exceptions are : motor vehicle traffic injuries where the 15-24 year age-group has the highest costs, falls where the 65-74 year age-group is the most costly and asphyxia where the 45-64 year age-group has the highest total costs. While total costs reflect differing age, gender, medical

treatment usage, morbidity and mortality patterns within the cause group, it should be noted that part of the higher cost of the 25-44 year age-group can be attributed to the fact that it represents a larger age-grouping.

The cost per injured person by cause, age and sex shown in Table 6-4 presents a different picture. Because drowning is almost always fatal, the total cost per person is very high. The cost per person drowned is highest for females aged 15-24 at around \$203,000 followed by males aged 25-44 at \$178,500. The total cost per person injured through self-harm/suicide ranks second and the highest cost is for males aged 45-64 years, at almost \$103,000 followed by males aged 15-24 years at almost \$81,000. Motor vehicle traffic injuries rank third in total cost per injured person, estimated at around \$17,000 with the highest cost for persons aged 25-44 years.

For most causes of injury the average cost per person is higher for males than females. The most notable exception is for drowning and near-drowning. Females have slightly higher average costs than males for injuries caused by poisoning, falls and interpersonal violence.

#### **6.4 INTENT OF INJURY**

While intentional injury only accounts for 6.5 percent of all injury cases, it is responsible for about 22 percent of the total cost of injury. Over three-quarters of this cost (76 percent) is due to suicide or self-harm. The major part of the total cost of suicide is due to mortality costs reflecting the high fatality rate and the young age-groups of the victims (see Tables 6-2, 6-3 and Figure 6-5). The mortality cost for male suicide deaths is over 3 times that of females reflecting the variation in the death rate from suicide between males and females. The morbidity costs of self-inflicted injury are greater for females (1.7 times that of males) reflecting the fact that females are more likely to be hospitalised for attempted suicide than males. On the other hand, the morbidity costs for males as a result of interpersonal violence are over three times that of females (see Table 6-3).

**Table 6-1: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993/94.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$2,582.933</b>	<b>\$758.945</b>	<b>\$1010.501</b>	<b>\$813.486</b>	<b>\$5,541</b>	<b>\$1,628</b>	<b>\$2,175</b>	<b>\$499,378</b>
0-4	\$76.637	\$45.555	\$22.671	\$8.411	\$1,764	\$1,048	\$522	\$311,526
5-14	\$160.175	\$73.079	\$71.324	\$15.772	\$1,819	\$830	\$810	\$543,852
15-24	\$715.056	\$151.384	\$305.861	\$257.812	\$6,893	\$1,459	\$2,958	\$813,286
25-44	\$958.683	\$201.868	\$396.020	\$360.795	\$7,124	\$1,500	\$2,953	\$759,569
45-64	\$388.542	\$116.136	\$125.393	\$147.013	\$7,089	\$2,119	\$2,302	\$424,893
65-74	\$172.616	\$59.893	\$89.040	\$23.683	\$9,607	\$3,333	\$4,995	\$169,165
75+	\$110.555	\$110.555	\$0	\$0	\$5,048	\$5,048	\$0	\$0
Unknown	\$0.668	\$0.476	\$0.192		\$393	\$280	\$113	
<b>Male</b>	<b>\$1,635.248</b>	<b>\$436.734</b>	<b>\$594.465</b>	<b>\$604.049</b>	<b>\$5,701</b>	<b>\$1,523</b>	<b>\$2,081</b>	<b>\$514,961</b>
0-4	\$44.452	\$26.831	\$12.809	\$4.812	\$1,811	\$1,093	\$522	\$300,741
5-14	\$99.872	\$46.910	\$42.782	\$10.181	\$1,908	\$896	\$817	\$509,027
15-24	\$517.072	\$107.363	\$206.936	\$202.773	\$7,170	\$1,489	\$2,880	\$792,083
25-44	\$667.053	\$136.773	\$256.892	\$273.389	\$7,323	\$1,502	\$2,832	\$740,891
45-64	\$230.410	\$68.926	\$60.036	\$101.448	\$7,237	\$2,165	\$1,902	\$377,132
65-74	\$49.201	\$22.849	\$14.905	\$11.447	\$6,479	\$3,009	\$1,987	\$125,786
75+	\$26.799	\$26.799	\$0	\$0	\$4,281	\$4,281	\$0	\$0
Unknown	\$0.390	\$0.283	\$0.107		\$374	\$271	\$102	
<b>Female</b>	<b>\$947.684</b>	<b>\$322.212</b>	<b>\$416.036</b>	<b>\$209.437</b>	<b>\$5,284</b>	<b>\$1,797</b>	<b>\$2,326</b>	<b>\$459,291</b>
0-4	\$32.185	\$18.724	\$9.862	\$3.599	\$1,702	\$990	\$522	\$327,213
5-14	\$60.303	\$26.169	\$28.543	\$5.591	\$1,689	\$733	\$800	\$621,241
15-24	\$197.984	\$44.021	\$98.925	\$55.038	\$6,263	\$1,393	\$3,135	\$902,268
25-44	\$291.630	\$65.095	\$139.128	\$87.407	\$6,706	\$1,497	\$3,207	\$824,591
45-64	\$158.132	\$47.210	\$65.357	\$45.565	\$6,884	\$2,055	\$2,855	\$591,749
65-74	\$123.415	\$37.043	\$74.136	\$12.236	\$11,898	\$3,571	\$7,181	\$249,724
75+	\$83.756	\$83.756	\$0	\$0	\$5,355	\$5,355	\$0	\$0
Unknown	\$0.278	\$0.193	\$0.085		\$424	\$295	\$130	

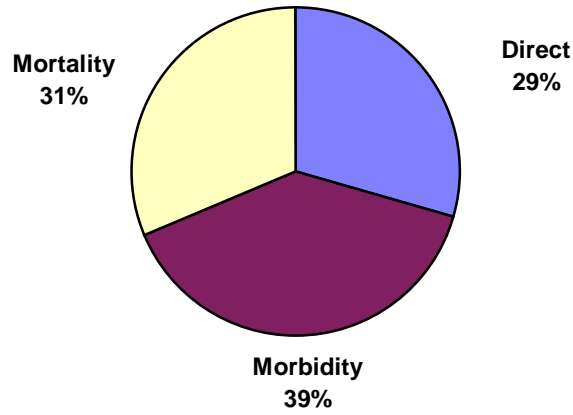
\* Based on 1629 deaths, including an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993/94.

**NOTE : Caution is required in interpreting costs for non-equivalent age-groups. However, cost per injured person can be directly compared.**

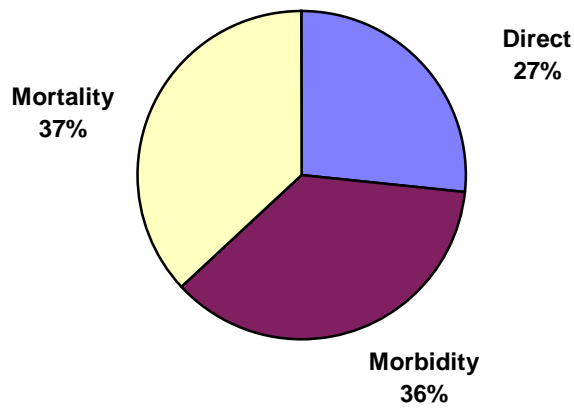
Totals may not add exactly due to rounding error.

*Figure 6-1 : Lifetime Cost of Injury by Type of Cost and Gender, 1993/94.*

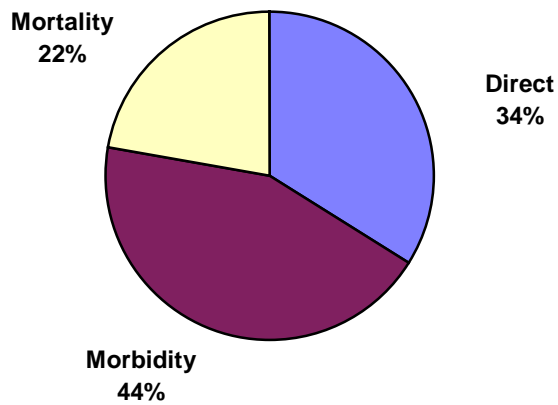
**Total \$2,582.9 million**



**Males \$1,635.2 million**

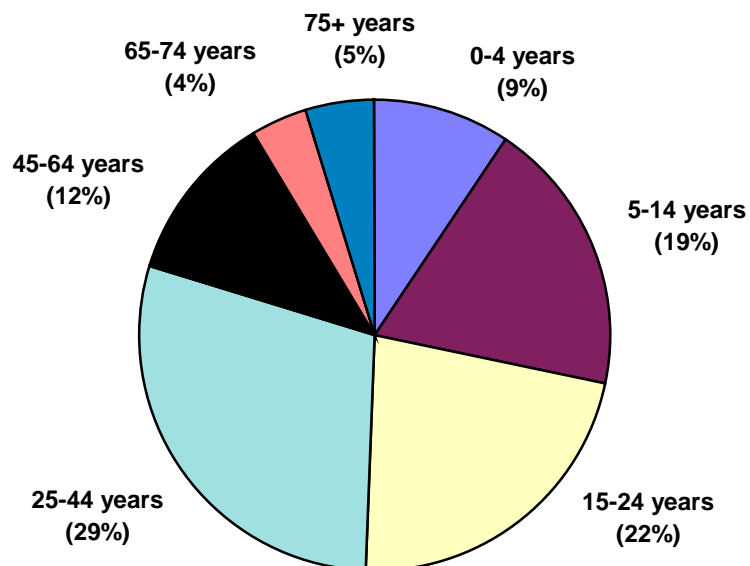


**Females \$947.7 million**

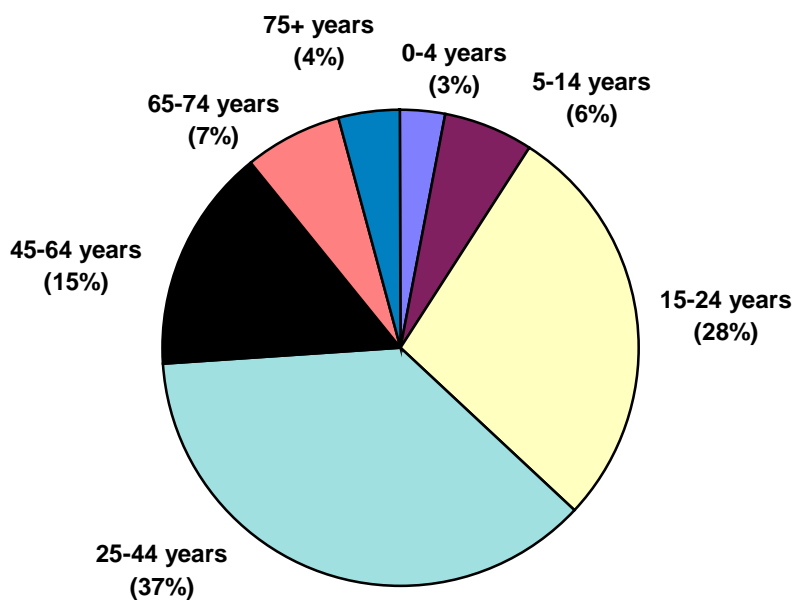


*Figure 6-2 : Distribution of Injured Persons and Lifetime Cost by Age, 1993/94.*

**466,191 Injuries**  
(inc. 142 later year deaths)

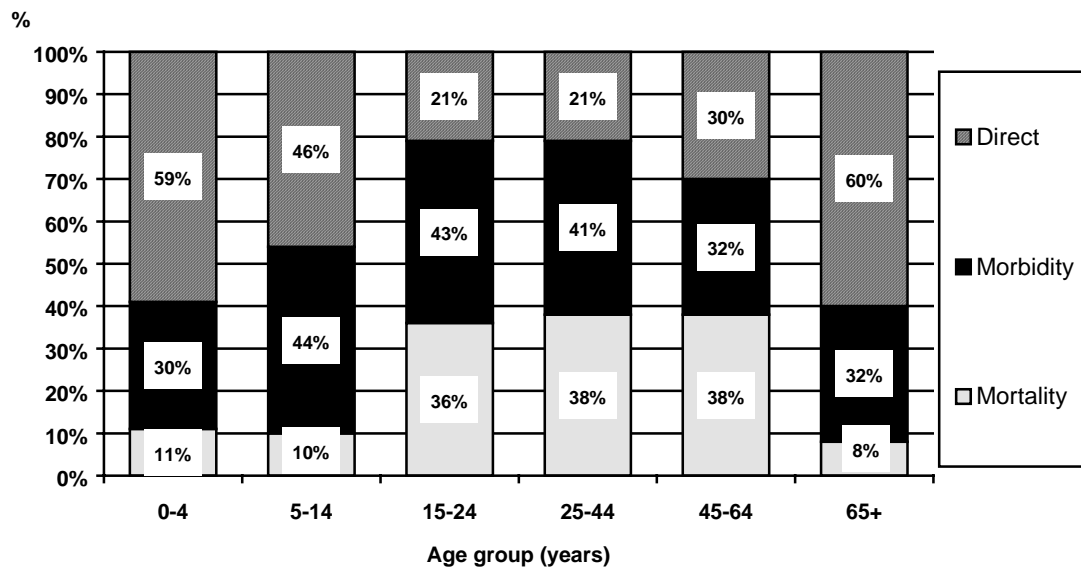


**\$2,582.9 Million Lifetime Cost**



NOTE : non-equivalent age-groupings

*Figure 6-3: Distribution of Lifetime Cost of Injury by Age and Type of Cost, 1993/94.*





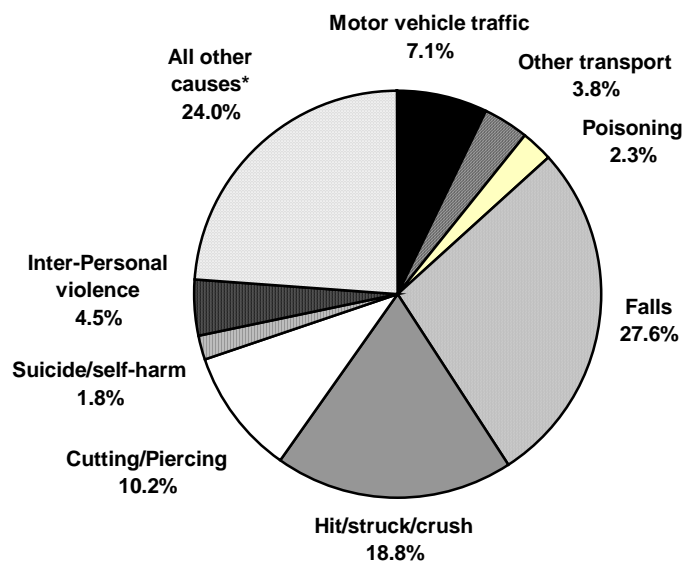
**Table 6-2: Lifetime Cost of Injury by Cause and Type of Cost, 1993/94**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$2,582.933</b>	<b>\$758.945</b>	<b>\$1010.501</b>	<b>\$813.486</b>	<b>\$5,541</b>	<b>\$1,628</b>	<b>\$2,175</b>	<b>\$499,378</b>
Motor vehicle traffic	\$570.542	\$125.686	\$155.373	\$289.484	\$17,181	\$3,785	\$4,751	\$575,515
Other transport	\$99.483	\$32.235	\$46.368	\$20.880	\$5,596	\$1,813	\$2,615	\$474,549
Drowning/near-	\$19.547	\$0.904	\$0.103	\$18.540	\$61,866	\$2,861	\$372	\$463,511
Poisoning	\$108.242	\$26.461	\$33.763	\$48.018	\$10,255	\$2,507	\$3,222	\$623,609
Falls	\$557.250	\$270.322	\$263.424	\$23.503	\$4,333	\$2,102	\$2,052	\$97,119
Fire/flames/burns	\$49.109	\$24.169	\$14.897	\$10.043	\$4,741	\$2,333	\$1,442	\$334,775
Hit/struck/crush	\$187.753	\$61.185	\$117.714	\$8.854	\$2,146	\$699	\$1,346	\$590,257
Cutting/piercing	\$99.648	\$30.179	\$67.188	\$2.281	\$2,106	\$638	\$1,420	\$760,224
Asphyxia	\$11.758	\$2.301	\$1.548	\$7.909	\$16,967	\$3,320	\$2,304	\$376,604
Other	\$318.756	\$114.897	\$188.690	\$15.169	\$3,205	\$1,155	\$1,898	\$379,221
Suicide/self-harm	\$428.407	\$40.385	\$62.762	\$325.261	\$51,540	\$4,859	\$8,079	\$597,906
IPV	\$117.417	\$26.769	\$54.247	\$36.402	\$5,624	\$1,282	\$2,606	\$616,979
Unknown intent	\$15.019	\$3.453	\$4.424	\$7.143	\$12,165	\$2,797	\$3,615	\$649,347
<b>Male</b>	<b>\$1,635.248</b>	<b>\$436.734</b>	<b>\$594.465</b>	<b>\$604.049</b>	<b>\$5,701</b>	<b>\$1,523</b>	<b>\$2,081</b>	<b>\$514,961</b>
Motor vehicle traffic	\$382.100	\$78.155	\$91.471	\$212.474	\$19,931	\$4,077	\$4,865	\$577,376
Other transport	\$66.656	\$20.879	\$27.859	\$17.918	\$6,181	\$1,936	\$2,592	\$471,514
Drowning/near-	\$14.729	\$0.625	\$0.086	\$14.018	\$57,357	\$2,432	\$379	\$483,380
Poisoning	\$56.834	\$12.992	\$15.226	\$28.616	\$9,881	\$2,259	\$2,670	\$572,329
Falls	\$263.242	\$120.579	\$123.083	\$19.579	\$4,059	\$1,859	\$1,901	\$154,166
Fire/flames/burns	\$32.645	\$17.050	\$8.891	\$6.704	\$5,458	\$2,850	\$1,491	\$372,438
Hit/struck/crush	\$147.561	\$47.886	\$90.821	\$8.854	\$2,394	\$777	\$1,474	\$590,257
Cutting/piercing	\$72.452	\$21.980	\$48.191	\$2.281	\$2,279	\$691	\$1,516	\$760,224
Asphyxia	\$7.654	\$1.246	\$0.511	\$5.897	\$20,010	\$3,258	\$1,391	\$393,118
Other	\$210.008	\$75.224	\$120.503	\$14.281	\$3,191	\$1,143	\$1,832	\$408,027
Suicide/self-harm	\$287.623	\$18.154	\$23.245	\$246.223	\$74,389	\$4,695	\$6,762	\$573,947
IPV	\$84.296	\$20.099	\$41.660	\$22.537	\$5,354	\$1,277	\$2,652	\$593,069
Unknown intent	\$9.448	\$1.864	\$2.916	\$4.668	\$11,862	\$2,340	\$3,698	\$583,512
<b>Female</b>	<b>\$947.684</b>	<b>\$322.212</b>	<b>\$416.036</b>	<b>\$209.437</b>	<b>\$5,284</b>	<b>\$1,797</b>	<b>\$2,326</b>	<b>\$459,291</b>
Motor vehicle traffic	\$188.442	\$47.530	\$63.902	\$77.010	\$13,425	\$3,386	\$4,597	\$570,442
Other transport	\$32.827	\$11.356	\$18.509	\$2.963	\$4,694	\$1,624	\$2,649	\$493,769
Drowning/near-	\$4.818	\$0.279	\$0.016	\$4.522	\$81,440	\$4,721	\$339	\$411,129
Poisoning	\$51.408	\$13.469	\$18.537	\$19.401	\$10,702	\$2,804	\$3,881	\$718,572
Falls	\$294.008	\$149.743	\$140.341	\$3.924	\$4,612	\$2,349	\$2,206	\$34,119
Fire/flames/burns	\$16.464	\$7.119	\$6.005	\$3.339	\$3,761	\$1,626	\$1,376	\$278,282
Hit/struck/crush	\$40.192	\$13.300	\$26.893	\$0	\$1,556	\$515	\$1,041	\$0
Cutting/piercing	\$27.196	\$8.199	\$18.997	\$0	\$1,751	\$528	\$1,223	\$0
Asphyxia	\$4.103	\$1.054	\$1.037	\$2.012	\$13,217	\$3,396	\$3,406	\$335,319
Other	\$108.748	\$39.673	\$68.187	\$0.888	\$3,232	\$1,179	\$2,027	\$177,581
Suicide/self-harm	\$140.785	\$22.230	\$39.517	\$79.038	\$31,668	\$5,000	\$9,125	\$687,285
IPV	\$33.121	\$6.669	\$12.586	\$13.865	\$6,451	\$1,299	\$2,461	\$660,246
Unknown intent	\$5.571	\$1.589	\$1.508	\$2.475	\$12,717	\$3,627	\$3,465	\$824,907

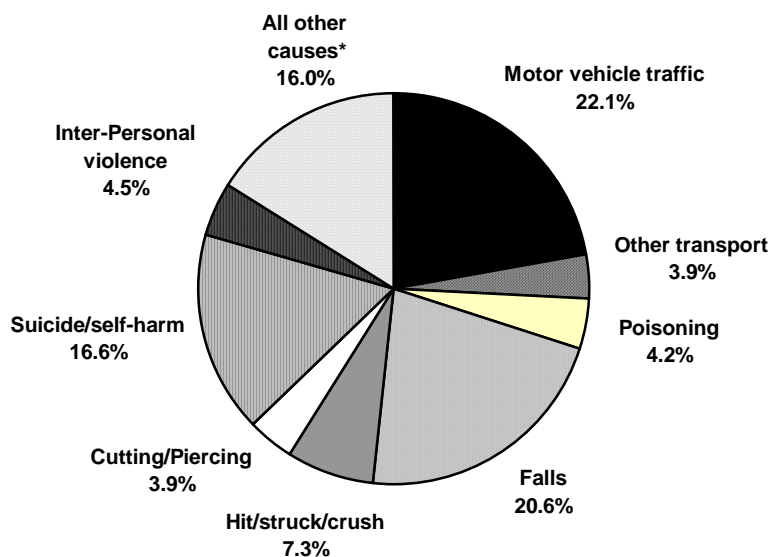
- Based on 1629 deaths, including an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993-94.

*Figure 6-4: Distribution of Injured Persons and Lifetime Cost by Cause, 1993/94.*

**466,191 Injuries**  
 (inc. 142 later year deaths)



**\$2,582.9 Million Lifetime Cost**



\* All other causes includes: Drowning, Fire/flame/burns, Asphyxia, Other unintentional, Unknown intent.

**Table 6-3: Lifetime Cost of Injury by Age, Gender and Cause, 1993/94 (\$ millions).**

**(ERRATUM p. 49)**

Age & gender	TOTAL	Motor vehicle traffic	Other transport	Drown- ing	Poison- ing	Falls	Fire/ Flames/ Burns	Cost (\$ millions)						
								Hit/ Struck/ Crush	Cutting/ Piercing	Asphyxia	Other uninten- tional	Self- harm	Inter- personal violence	Unknown intent
<b>Total</b>	<b>2,582.933</b>	<b>570.542</b>	<b>99.483</b>	<b>19.547</b>	<b>108.242</b>	<b>557.250</b>	<b>49.109</b>	<b>187.753</b>	<b>99.648</b>	<b>11.758</b>	<b>318.756</b>	<b>428.407</b>	<b>117.417</b>	<b>15.019</b>
0-4	76.637	4.343	2.710	4.193	11.634	22.426	8.001	6.865	4.012	0.891	10.282	0.026	1.167	0.088
5-14	160.175	17.956	17.288	1.327	1.787	66.153	2.579	18.376	7.780	2.190	19.089	3.130	2.413	0.106
15-24	715.056	223.578	28.362	1.845	22.587	74.321	11.428	69.571	31.019	0.915	75.258	129.557	43.527	3.087
25-44	958.683	220.581	34.037	9.924	52.952	102.833	13.588	71.534	42.236	2.598	133.180	212.770	53.395	9.055
45-64	388.542	78.514	14.235	1.255	15.373	91.992	9.146	17.470	11.901	3.498	57.944	70.464	14.351	2.400
65-74	172.616	18.274	2.140	0.985	2.785	109.307	3.674	2.311	1.799	1.428	15.773	11.734	2.203	0.204
75+	110.55	7.255	0.687	0.018	1.095	90.011	0.683	1.509	0.829	0.193	7.153	0.722	0.324	0.076
Unknown	0.668	0.041	0.023	0.000	0.029	0.206	0.009	0.118	0.073	0.045	0.078	0.005	0.038	0.004
<b>Male</b>	<b>1635.248</b>	<b>382.100</b>	<b>66.656</b>	<b>14.729</b>	<b>56.834</b>	<b>263.242</b>	<b>32.645</b>	<b>147.561</b>	<b>72.452</b>	<b>7.654</b>	<b>210.008</b>	<b>287.623</b>	<b>84.296</b>	<b>9.448</b>
0-4	44.452	3.273	1.618	1.698	6.577	12.648	4.758	4.176	2.515	0.678	5.708	0.014	0.745	0.044
5-14	99.872	11.179	10.028	1.297	0.793	40.426	2.343	12.821	5.192	0.534	11.820	1.324	2.065	0.049
15-24	517.072	161.027	18.418	0.943	10.342	50.087	9.791	57.473	24.173	0.868	53.698	95.685	32.906	1.661
25-44	667.053	156.029	24.403	8.954	29.468	69.600	8.950	57.999	31.375	2.480	95.022	137.430	39.925	5.417
45-64	230.410	40.383	10.764	1.255	7.514	48.266	5.007	13.382	7.865	2.488	35.992	47.498	7.830	2.166
65-74	49.201	7.126	1.131	0.572	1.766	22.696	1.467	1.176	0.979	0.493	5.667	5.365	0.681	0.083
75+	26.799	3.071	0.279	0.009	0.369	19.422	0.322	0.458	0.303	0.072	2.052	0.302	0.115	0.026
Unknown	0.390	0.013	0.016	0.000	0.005	0.097	0.007	0.077	0.050	0.042	0.048	0.004	0.029	0.002
<b>Female</b>	<b>947.684</b>	<b>188.442</b>	<b>32.827</b>	<b>4.818</b>	<b>51.408</b>	<b>294.008</b>	<b>16.464</b>	<b>40.192</b>	<b>27.196</b>	<b>4.103</b>	<b>108.748</b>	<b>140.785</b>	<b>33.121</b>	<b>5.571</b>
0-4	32.185	1.070	1.092	2.494	5.057	9.778	3.243	2.689	1.497	0.213	4.574	0.012	0.422	0.044
5-14	60.303	6.778	7.260	0.030	0.994	25.727	0.237	5.554	2.588	1.656	7.268	1.806	0.348	0.057
15-24	197.984	62.551	9.944	0.902	12.245	24.234	1.637	12.098	6.846	0.047	21.560	33.872	10.621	1.426
25-44	291.630	64.552	9.634	0.970	23.484	33.233	4.638	13.535	10.861	0.118	38.158	75.339	13.469	3.637
45-64	158.132	38.131	3.472	0.000	7.859	43.726	4.138	4.089	4.036	1.010	21.951	22.965	6.521	0.234
65-74	123.415	11.149	1.009	0.414	1.019	86.611	2.207	1.135	0.820	0.935	10.106	6.369	1.521	0.120
75+	83.756	4.184	0.408	0.008	0.726	70.589	0.362	1.051	0.526	0.121	5.101	0.420	0.209	0.051
Unknown	0.278	0.028	0.007	0.000	0.024	0.109	0.002	0.041	0.023	0.003	0.030	0.001	0.009	0.003

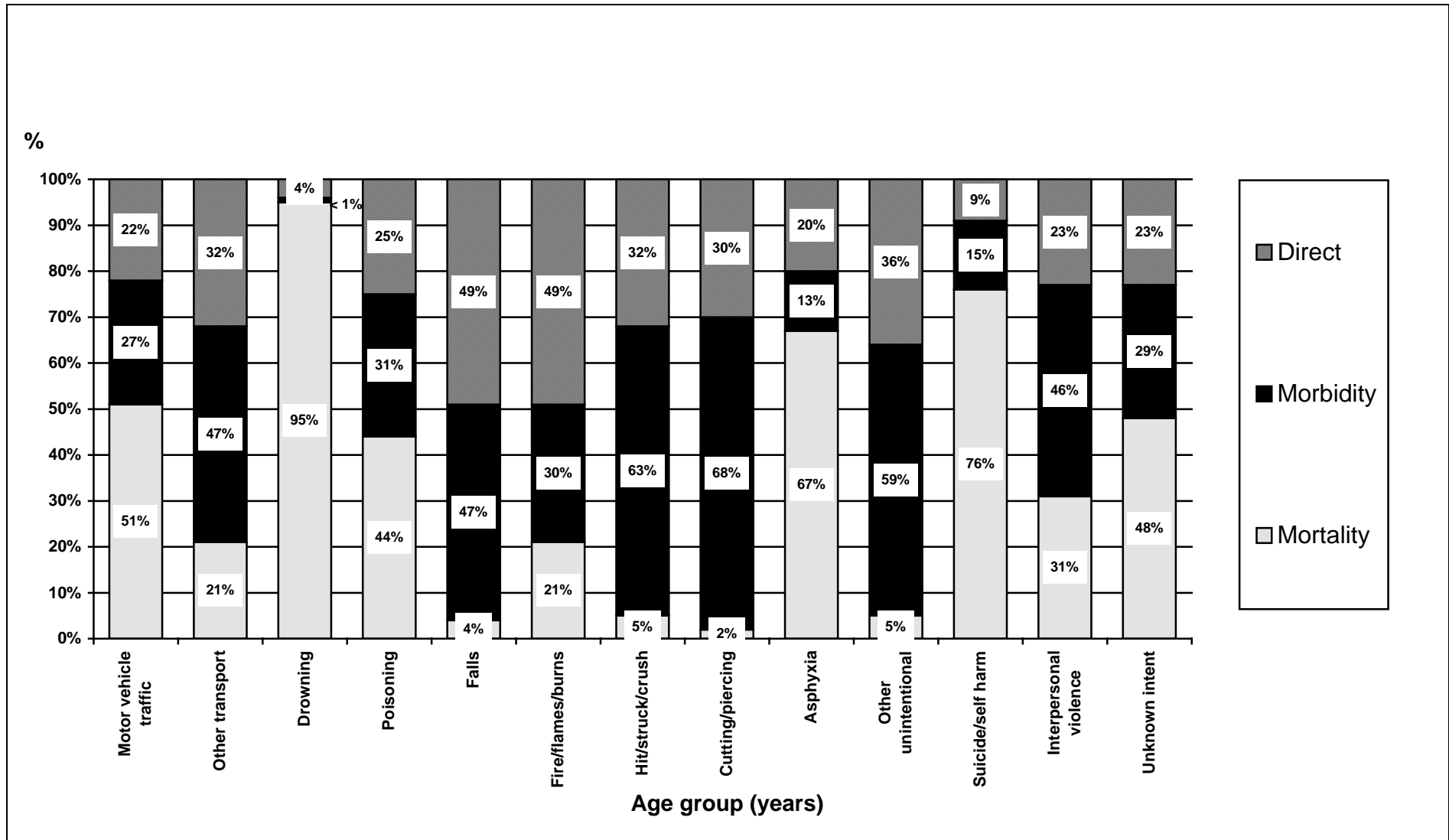
**NOTE : Caution is required in interpreting data from non-equivalent age-groups.**

**Table 6-4: Lifetime Cost of Injury per Injured Person by Age, Gender and Cause, 1993/94 (\$).**

<b>Age &amp; gender</b>	<b>TOTAL</b>	<b>Motor vehicle traffic</b>	<b>Other transport</b>	<b>Drown- ing</b>	<b>Poisoning</b>	<b>Falls</b>	<b>Fire/ Flames/ Burns</b>	<b>Average Hit/ Struck/ Crush</b>	<b>Cost (\$) Cutting/ Piercing</b>	<b>Asphyxia</b>	<b>Other uninten- tional</b>	<b>Suicide</b>	<b>Inter- personal violence</b>	<b>Unknown intent</b>
<b>Total</b>	<b>5,541</b>	<b>17,181</b>	<b>5,596</b>	<b>61,866</b>	<b>10,255</b>	<b>4,333</b>	<b>4,741</b>	<b>2,146</b>	<b>2,106</b>	<b>16,967</b>	<b>3,205</b>	<b>51,540</b>	<b>5,624</b>	<b>12,165</b>
0-4	1,764	5,712	2,588	30,301	2,555	1,380	4,004	1,090	1,276	5,171	1,204	496	2,786	1,202
5-14	1,819	4,192	3,197	48,691	2,835	1,885	2,273	883	1,385	27,747	1,457	13,337	1,576	827
15-24	6,893	20,431	5,984	51,025	13,317	3,893	4,714	3,112	2,956	10,313	3,679	48,795	5,246	6,832
25-44	7,124	20,446	8,074	154,905	21,878	4,950	4,808	2,682	2,427	15,876	3,667	51,438	6,369	21,922
45-64	7,089	19,352	8,980	31,296	21,282	6,508	7,439	2,333	1,653	30,727	3,770	72,687	8,009	22,313
65-74	9,607	14,349	5,494	123,153	10,455	13,256	11,328	1,198	867	37,145	5,294	73,788	8,844	6,937
75+	5,048	7,198	2,073	8,856	4,754	6,206	1,825	949	750	6,318	2,881	7,610	2,566	3,158
Unknown	393	432	367	0	808	398	190	346	253	6,833	371	521	475	559
<b>Male</b>	<b>5,701</b>	<b>19,931</b>	<b>6,181</b>	<b>57,357</b>	<b>9,881</b>	<b>4,059</b>	<b>5,458</b>	<b>2,394</b>	<b>2,279</b>	<b>20,010</b>	<b>3,191</b>	<b>74,389</b>	<b>5,354</b>	<b>11,862</b>
0-4	1,811	8,062	2,524	15,236	2,627	1,372	4,292	1,130	1,274	7,308	1,266	330	3,732	1,106
5-14	1,908	4,174	2,950	74,762	2,304	2,146	3,856	916	1,466	14,938	1,562	10,394	1,868	522
15-24	7,170	24,401	5,908	29,744	11,512	4,087	6,770	3,293	3,097	13,565	3,730	80,616	5,017	5,431
25-44	7,323	24,225	10,227	178,503	20,880	5,870	4,779	2,925	2,589	20,110	3,591	71,627	6,285	20,458
45-64	7,237	20,517	11,943	31,296	22,185	7,621	8,524	2,729	1,723	63,062	3,472	102,628	6,205	31,086
65-74	6,479	13,186	5,669	114,308	11,095	8,706	13,624	1,155	805	26,949	3,959	70,118	3,402	5,696
75+	4,281	6,479	3,108	9,452	4,401	5,535	1,532	865	868	8,005	2,195	7,063	5,306	4,368
Unknown	374	200	315		391	407	168	345	223		355	495	668	572
<b>Female</b>	<b>5,284</b>	<b>13,425</b>	<b>4,694</b>	<b>81,440</b>	<b>10,702</b>	<b>4,612</b>	<b>3,761</b>	<b>1,556</b>	<b>1,751</b>	<b>13,217</b>	<b>3,232</b>	<b>31,668</b>	<b>6,451</b>	<b>12,717</b>
0-4	1,702	3,019	2,690	92,718	2,466	1,390	3,646	1,032	1,278	2,677	1,135	1,244	1,925	1,317
5-14	1,689	4,223	3,615	3,004	3,475	1,584	449	816	1,247	38,346	1,314	16,828	817	1,632
15-24	6,263	14,400	6,128	202,611	15,351	3,546	1,674	2,466	2,545	1,904	3,558	23,070	6,113	9,768
25-44	6,706	14,848	5,266	69,769	23,274	3,726	4,863	1,978	2,057	2,923	3,872	33,972	6,631	24,536
45-64	6,884	18,254	5,076	0	20,485	5,605	6,446	1,583	1,532	13,581	4,387	45,333	12,305	6,169
65-74	11,898	15,206	5,310	137,896	9,505	15,360	10,188	1,247	954	46,396	6,529	77,191	31,162	8,172
75+	5,355	7,837	1,689	8,260	4,956	6,421	2,200	992	696	5,614	3,296	8,059	2,000	2,770
Unknown	424	937	594		1,037	390	345	348	355	381	400	652	249	551

**NOTE : Caution is required when interpreting data from non-equivalent age-groupings.**

Figure 6-5: Distribution of Lifetime Cost of Injury by Cause and Type of Cost, 1993/94.





## 6.5 INJURY SEVERITY

There are three levels of injury reflecting severity : 1629 deaths (1487 deaths occurring in 1993/94 and an estimated 142 deaths occurring in later years as a result of injury sustained in that year), 67,402 hospitalised injury cases and 397,160 non-hospitalised injured persons. The latter group, although large, involves the least severe injuries with relatively low costs. It is expected that the incidence of injury at this level of severity is under-estimated due to the nature of current injury surveillance systems. The VEMD and ELVIS collections identify injury cases which present to a hospital Emergency department or a general practitioner. Cases whose sole treatment is from an allied health professional such as a physiotherapist, chiropractor or osteopath or who present to a specialist sports or workplace clinic are not included in these estimates.

Of the estimated \$2,583 million lifetime cost, \$824.7 million or 32 percent is the cost of fatalities. Included is a relatively small amount of direct costs, the majority of the total cost being the mortality costs associated with premature death. More than half of the total lifetime cost is for injuries involving hospitalisation (\$1,389 million or 54 percent) with less than 15 percent (or \$369 million) for non-hospitalised injury cases (Table 6-5 and 6-6).

The cost per injured person for each level of injury also reflects severity. The cost per fatality is \$506,267, which consists mainly of the present value of foregone earnings (paid and unpaid productivity). The cost per hospitalised injury is \$20,607, substantially greater than the \$929 per non-hospitalised case.

### 6.5.1 Age and gender

The distribution of lifetime costs by severity of injury varies by gender and age. Table 6-5 shows the total lifetime cost of injury by age, gender and level of severity.

Of the total 1,629 injury fatalities occurring as a result of injuries sustained in 1993/94, 72.5 percent were males and 27.5 percent were females. This is reflected in the lifetime costs for injury fatalities where males account for \$276.5 million or 74 percent of the total (\$824.7 million). Of the 67,402 hospitalised injured persons, 38,839 or 58 percent were males who accounted for 57 percent (\$798.3 million) of the total lifetime costs (\$1,389.1 million). Males also incur more minor injuries than females, accounting for 62 percent of non-hospitalised injuries and they incur about the same proportion (61 percent or \$225 million) of the \$369.2 million cost of non-hospitalised injury.

Of the 1,629 deaths resulting from injury in 1993/94, 29 percent were in the 25-44 year age-group. The total lifetime cost for this group (\$363.5 million) comprises 44 percent of the total cost of fatalities. Young adults aged 15-24 accounted for around 20 percent of all fatalities and 31 percent of the total cost of fatalities. Deaths in this age-group incur the highest average cost at \$819,046 per death. People who die prematurely in this age-group are at the peak of their productivity and the present value of future earnings lost is significant. By contrast, almost 27 percent of injury fatalities are persons aged over 65 years but they account for only 3 percent (\$27.4 million) of the lifetime cost of fatalities with an average cost per death of \$63,965. It should be noted that the death rate from injury shows a different picture. The rate of fatalities per 100,000 persons is highest for the 75 + age-group (115), followed by the 15-24 year-olds (42), the 65-74 year olds (41), the 45-64 year olds (36) and then the 25-44 year olds (32) (see Table 5-1).

Injured persons aged 25-44 years account for 27 percent of all injury hospitalisations and 29 percent of non-hospitalised injury cases and comprise 32 percent and 42 percent of the total lifetime cost respectively. Young adults aged 15-24 year account for 20 percent of injury hospitalisations and 23 percent of non-hospitalised cases and comprise 23 percent and 35 percent of the total lifetime cost respectively. Of the hospitalised cases, persons aged 65-74 years had the highest average lifetime costs at \$28,867 possibly reflecting the large number of falls in this age-group resulting in often lengthy

hospitalisations, recuperation periods and/or nursing home stays. Young adults aged 15-24 years have the second highest cost per hospitalised injury at \$24,396 per person. Persons in this age-group also have the highest average cost per non-hospitalised injury at \$1,440.

Again the injury rates for less severe injury show a different picture to the costs. The rates for hospitalised injury are highest for the elderly over 75 years (4,485 per 100,000), followed by 15-24 year olds (1,908 per 100,000) then the 65-74 year olds (1,505 per 100,000). The non-hospitalised injury rate is highest for 5-14 year olds (12,916 per 100,000) followed by 15-24 year olds (12,870 per 100,000) then 0-4 year olds (12,197 per 100,000) (see Table 5-1).

### **6.5.2 Cause of injury**

Table 6-6 shows total cost and cost per injured person by cause and level of injury severity. For fatalities, suicide ranks highest, totalling almost \$329 million, followed by motor vehicle traffic deaths at \$293 million. The lowest ranking cost is for asphyxia at \$12 million. On the basis of cost per fatality, cutting/piercing and poisoning rank highest at \$765,903 and \$629,970 respectively. The least costly fatalities are those from falls, estimated at \$105,994. Over 80 percent of deaths from falls occur in persons aged 65 years and older. Their labour force participation rate and earnings are low and life expectancy short, resulting in a lower cost per fatality.

Falls account for the greatest cost of hospitalised injuries (\$456 million), followed by 'other' injuries (\$249 million) and motor vehicle traffic injuries (\$199 million). The cost per hospitalised person ranges from \$9,199 for near-drownings to \$35,164 for fire, flame and burn injuries. The second and third most costly hospitalised injuries are motor vehicle traffic injuries and attempted suicide at \$32,544 and \$23,863 respectively. As expected the cost per non-hospitalised injury is the lowest ranging from \$317 for near-drowning to \$2,956 for motor vehicle traffic injuries.

## **6.6 SETTING AND ACTIVITY AT TIME OF INJURY**

An estimate of the incidence of injury that occurs in different settings and during different activities is provided here in an attempt to identify areas of concern that may have been concealed by the ICD-9 disaggregation by cause. Caution should be exercised if comparing the estimates presented here with the cause groups because both the incidence of injury and the costs (although based on the same data) have been derived in a different way (see Section 4.8.6 for details of methodology and Section 5.6 for incidence data).

When considering setting (Table 6-7), injuries that occur in private homes account for the greatest proportion of the lifetime cost of injury (\$985.5 million), followed by areas of transportation (\$708.7 million) then areas of sport and recreation (\$212.5 million).

In terms of activity being undertaken (Table 6-8), injuries associated with transportation are the most costly at \$651.3 million, followed by sport and recreation injuries (\$556.2 million), intentional self-harm (\$428.4 million) then work-related injuries (\$187.8 million). The lifetime cost estimate for work-related injury for 1993-94 is an underestimate of the real cost, given that WorkCover alone paid out a total of \$245.645 million in direct treatment costs, income support and lump sum compensation payments to December 31, 1996 (see Chapter 7). This underestimation is probably due to the likely underestimation of long-term costs (direct and morbidity) and of non-hospitalised morbidity costs in this study.



**Table 6-5: Total Lifetime Cost of Injury by Age, Gender and Level of Injury Severity, 1993/94**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Fatalities	Hospitalised	Non-Hospitalised	Total	Fatalities	Hospitalised	Non-Hospitalised
<b>Total</b>	<b>\$2,582.933</b>	<b>\$824.709</b>	<b>\$1,389.068</b>	<b>\$369.155</b>	<b>\$5,541</b>	<b>\$506,267</b>	<b>\$20,609</b>	<b>\$929</b>
0-4	\$76.637	\$8.620	\$58.720	\$9.298	\$1,764	\$319,265	\$13,797	\$237
5-14	\$160.175	\$15.888	\$125.128	\$19.159	\$1,819	\$547,863	\$16,071	\$239
15-24	\$715.056	\$259.638	\$325.732	\$129.686	\$6,893	\$819,046	\$24,396	\$1,440
25-44	\$958.683	\$363.473	\$441.017	\$154.194	\$7,124	\$765,206	\$24,320	\$1,330
45-64	\$388.542	\$149.700	\$195.297	\$43.544	\$7,089	\$432,659	\$20,651	\$968
65-74	\$172.616	\$24.602	\$138.474	\$9.540	\$9,607	\$175,730	\$28,867	\$732
75+	\$110.555	\$2.788	\$104.636	\$3.130	\$5,048	\$9,452	\$10,885	\$261
Missing	\$0.668		\$0.065	\$0.603	\$393		\$9,271	\$356
<b>Male</b>	<b>\$1,635.248</b>	<b>\$611.931</b>	<b>\$798.286</b>	<b>\$225.032</b>	<b>\$5,701</b>	<b>\$521,680</b>	<b>\$20,554</b>	<b>\$912</b>
0-4	\$44.452	\$4.936	\$34.138	\$5.378	\$1,811	\$308,480	\$13,606	\$244
5-14	\$99.872	\$10.261	\$78.504	\$11.107	\$1,908	\$513,038	\$15,748	\$235
15-24	\$517.072	\$204.248	\$229.008	\$83.816	\$7,170	\$797,843	\$24,035	\$1,345
25-44	\$667.053	\$275.469	\$292.456	\$99.128	\$7,323	\$746,528	\$24,029	\$1,262
45-64	\$230.410	\$103.537	\$105.899	\$20.974	\$7,237	\$384,897	\$19,254	\$805
65-74	\$49.201	\$12.044	\$34.047	\$3.110	\$6,479	\$132,352	\$18,178	\$552
75+	\$26.799	\$1.437	\$24.206	\$1.156	\$4,281	\$9,452	\$10,668	\$301
Missing	\$0.390		\$0.027	\$0.363	\$374		\$6,726	\$349
<b>Female</b>	<b>\$947.684</b>	<b>\$212.778</b>	<b>\$590.783</b>	<b>\$144.123</b>	<b>\$5,284</b>	<b>\$466,619</b>	<b>\$20,684</b>	<b>\$959</b>
0-4	\$32.185	\$3.684	\$24.581	\$3.920	\$1,702	\$334,952	\$14,071	\$229
5-14	\$60.303	\$5.627	\$46.623	\$8.052	\$1,689	\$625,252	\$16,645	\$245
15-24	\$197.984	\$55.390	\$96.724	\$45.870	\$6,263	\$908,029	\$25,294	\$1,654
25-44	\$291.630	\$88.004	\$148.560	\$55.066	\$6,706	\$830,228	\$24,914	\$1,472
45-64	\$158.132	\$46.163	\$89.399	\$22.570	\$6,884	\$599,515	\$22,593	\$1,192
65-74	\$123.415	\$12.558	\$104.427	\$6.430	\$11,898	\$256,290	\$35,714	\$869
75+	\$83.756	\$1.352	\$80.431	\$1.974	\$5,355	\$9,452	\$10,952	\$242
Missing	\$0.278		\$0.038	\$0.240	\$424		\$12,664	\$368

\* Based on 1629 deaths, including an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993/94.

**NOTE: Caution should be exercised when comparing total costs for non-equivalent age-groups**

**Table 6-6: Total Lifetime Cost of Injury by Cause and Level of Injury Severity, Victoria, 1993/94**

Cause & gender	Cost (millions)				Cost per Injured Person			
	Total	Fatalities*	Hospital-ised	Non-hospital-ised	Total	Fatalities*	Hospital-ised	Non-hospital-ised
<b>Total</b>	<b>\$2,582.933</b>	<b>\$824.709</b>	<b>\$1,389.068</b>	<b>\$369.155</b>	<b>\$5,541</b>	<b>\$506,627</b>	<b>\$20,609</b>	<b>\$929</b>
Motor vehicle traffic	\$570.542	\$292.776	\$199.171	\$78.596	\$17,181	\$582,059	\$32,544	\$2,956
Other transport	\$99.483	\$21.181	\$65.460	\$12.841	\$5,596	\$481,396	\$21,191	\$877
Drowning	\$19.547	\$18.802	\$0.681	\$0.064	\$61,866	\$470,057	\$9,199	\$317
Poisoning	\$108.242	\$48.508	\$50.291	\$9.443	\$10,255	\$629,970	\$18,215	\$1,224
Falls	\$557.250	\$25.651	\$456.218	\$75.380	\$4,333	\$105,994	\$19,698	\$717
Fire/flames/burns	\$49.109	\$10.278	\$32.562	\$6.269	\$4,741	\$342,614	\$35,164	\$667
Hit/struck/crush	\$187.753	\$8.952	\$117.272	\$61.529	\$2,146	\$596,814	\$18,289	\$759
Cutting/piercing	\$99.648	\$2.298	\$59.623	\$37.728	\$2,106	\$765,903	\$15,942	\$866
Asphyxia	\$11.758	\$8.049	\$3.463	\$0.246	\$16,967	\$383,266	\$15,390	\$551
Other	\$318.756	\$15.448	\$248.239	\$55.070	\$3,205	\$386,188	\$18,020	\$643
Suicide	\$428.407	\$328.773	\$92.850	\$6.784	\$51,540	\$604,363	\$23,863	\$1,750
IPV	\$117.417	\$36.780	\$56.752	\$23.885	\$5,624	\$623,395	\$19,850	\$1,330
Unknown intent	\$15.019	\$7.213	\$6.488	\$1.318	\$12,165	\$655,769	\$17,630	\$1,541
<b>Male</b>	<b>\$1,635.248</b>	<b>\$611.931</b>	<b>\$798.286</b>	<b>\$225.032</b>	<b>\$5,701</b>	<b>\$521,680</b>	<b>\$20,554</b>	<b>\$912</b>
Motor vehicle traffic	\$382.100	\$214.854	\$124.753	\$42.493	\$19,931	\$583,842	\$33,268	\$2,823
Other transport	\$66.656	\$18.175	\$42.029	\$6.452	\$6,181	\$478,282	\$21,378	\$735
Drowning	\$14.729	\$14.201	\$0.475	\$0.052	\$57,357	\$489,696	\$9,507	\$295
Poisoning	\$56.834	\$28.932	\$23.824	\$4.078	\$9,881	\$578,637	\$17,127	\$946
Falls	\$263.242	\$20.661	\$202.630	\$39.951	\$4,059	\$162,688	\$19,911	\$732
Fire/flames/burns	\$32.645	\$6.841	\$21.965	\$3.839	\$5,458	\$380,068	\$36,245	\$717
Hit/struck/crush	\$147.561	\$8.952	\$93.491	\$45.118	\$2,394	\$596,814	\$18,815	\$796
Cutting/piercing	\$72.452	\$2.298	\$44.205	\$25.949	\$2,279	\$765,903	\$15,907	\$894
Asphyxia	\$7.654	\$5.999	\$1.507	\$0.148	\$20,010	\$399,944	\$12,560	\$599
Other	\$210.008	\$14.526	\$160.047	\$35.435	\$3,191	\$415,017	\$17,841	\$624
Suicide	\$287.623	\$248.995	\$35.710	\$2.918	\$74,389	\$580,352	\$22,759	\$1,561
IPV	\$84.296	\$22.775	\$43.791	\$17.730	\$5,354	\$599,352	\$19,207	\$1,321
Unknown intent	\$9.448	\$4.722	\$3.859	\$0.867	\$11,862	\$590,213	\$18,289	\$1,502
<b>Female</b>	<b>\$947.684</b>	<b>\$212.778</b>	<b>\$590.783</b>	<b>\$144.123</b>	<b>\$5,284</b>	<b>\$466,619</b>	<b>\$20,684</b>	<b>\$959</b>
Motor vehicle traffic	\$188.442	\$77.922	\$74.418	\$36.103	\$13,425	\$577,200	\$31,400	\$3,131
Other transport	\$32.827	\$3.007	\$23.431	\$6.389	\$4,694	\$501,118	\$20,865	\$1,089
Drowning	\$4.818	\$4.601	\$0.205	\$0.012	\$81,440	\$418,283	\$8,557	\$479
Poisoning	\$51.408	\$19.576	\$26.467	\$5.365	\$10,702	\$725,029	\$19,319	\$1,575
Falls	\$294.008	\$4.989	\$253.589	\$35.430	\$4,612	\$43,385	\$19,531	\$700
Fire/flames/burns	\$16.464	\$3.437	\$10.597	\$2.430	\$3,761	\$286,433	\$33,117	\$601
Hit/struck/crush	\$40.192	\$0	\$23.781	\$16.411	\$1,556	\$0	\$16,480	\$673
Cutting/piercing	\$27.196	\$0	\$15.418	\$11.778	\$1,751	\$0	\$16,044	\$808
Asphyxia	\$4.103	\$2.049	\$1.956	\$0.098	\$13,217	\$341,570	\$18,625	\$491
Other	\$108.748	\$0.922	\$88.191	\$19.635	\$3,232	\$184,387	\$18,354	\$681
Suicide	\$140.785	\$79.778	\$57.140	\$3.867	\$31,668	\$693,722	\$24,608	\$1,925
IPV	\$33.121	\$14.005	\$12.961	\$6.155	\$6,451	\$666,900	\$22,384	\$1,357
Unknown intent	\$5.571	\$2.492	\$2.629	\$0.451	\$12,717	\$830,585	\$16,744	\$1,621

• Based on 1629 deaths, including an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Table 6-7 Total lifetime cost of injury, setting of injury event by injury severity, Victoria, 1993/94.**

Setting of injury event	Cost (millions)			
	Total	Fatalities*	Hospitalised	Non-hospitalised
<b>Total</b>	<b>\$2,582.933</b>	<b>\$824.709</b>	<b>\$1,389.068</b>	<b>\$369.155</b>
Production	\$49.805	\$11.183	\$24.134	\$14.488
Commerce	\$83.224	\$7.625	\$51.533	\$24.066
Farm	\$31.542	\$7.117	\$19.380	\$5.045
Transport area	\$708.739	\$334.287	\$280.785	\$93.667
Sporting area	\$55.043	\$2.035	\$30.414	\$22.594
Recreational area	\$157.404	\$67.594	\$71.282	\$18.528
Private residential	\$985.520	\$319.647	\$558.478	\$107.395
Institutional	\$105.675	\$51.331	\$46.876	\$7.468
Educational	\$78.315	\$2.543	\$47.573	\$28.199
Other specified	\$49.556		\$43.727	\$5.829
Unspecified	\$278.109	\$21.347	\$214.886	\$41.876

- Includes 142 later year deaths.

**Table 6-8: Total lifetime cost, activity at time of injury by injury severity, Victoria, 1993/4.**

Activity at time of injury	Cost (millions)			
	Total	Fatalities*	Hospitalised	Non-hospitalised
<b>Total</b>	<b>\$2,582.933</b>	<b>\$824.709</b>	<b>\$1,389.068</b>	<b>\$369.155</b>
Sports	\$68.072	\$0.507	\$44.848	\$22.717
Leisure	\$488.120	\$12.958	\$375.440	\$99.722
Paid work	\$187.766	\$24.318	\$130.699	\$32.749
Other work/ household activities	\$48.627	\$13.457	\$26.909	\$8.261
Education	\$7.190		\$5.125	\$2.065
Personal activities/care	\$89.079	\$8.473	\$70.575	\$10.031
Transportation #	\$651.330	\$301.758	\$259.221	\$90.351
Self-harm	\$428.407	\$328.773	\$92.850	\$6.784
Interpersonal violence	\$117.417	\$36.780	\$56.752	\$23.885
Other specified	\$161.627	\$97.685	\$51.255	\$12.687
Other unspecified/ missing	\$335.297		\$275.394	\$59.903

- Includes 142 later year deaths.

- # Includes injury causes of motor vehicle traffic accident and other transport and/or motor vehicle non-traffic accidents but excludes work-related injuries.

## 6.7 TYPE OF COST

As noted above, three types of lifetime cost are estimated : 1) direct cost , the expenditure for medical care and related services, amounting to \$759 million, or 29 percent of the total lifetime cost of injury; 2) morbidity cost, valued at \$1,010.5 million, or 39 percent of the total; and 3) mortality cost, amounting to \$813.5 million, or 31 percent of the total.

### 6.7.1 Direct cost

Direct cost includes the medical and non-medical costs associated with an injury. They include costs such as hospital (inpatient & Emergency Dept. - private and public), medical (general & specialist services), rehabilitation services and nursing home accommodation costs associated with the treatment of injury. Other direct costs include ambulance transport, pharmaceuticals and treatment by health professionals other than medical practitioners and other expenses such as aids and appliances for injured persons. They may also include the cost of caring for an injured person at home such as attendant care or professional home nursing. Non-medical direct costs related to injuries include amounts spent on home modification and road rescue costs in the case of motor vehicle accidents. Since this report focuses on the cost of injury, non-medical costs are limited to those related to the injured person and exclude the costs associated with the damage caused by the event that resulted in the injury.

Total direct personal medical and non-medical costs of care for persons injured in 1993/94 are estimated at almost \$759 million or \$1,629 per injured person (Table 6-2). It should be noted that average costs are skewed towards the cost of less severe non-hospitalised injuries since they account for the majority of cases (the average direct cost for a fatality being \$6,890; a hospitalisation, \$9,591; and a non-hospitalised case, \$255). Although hospitalised injuries account for only about 15 percent of all injured persons, they consume the greatest proportion (85 percent) of spending on injury treatment.

Unintentional injury accounts for 90 percent of the direct treatment and related costs (\$688.3 million). Of the single causes, falls account for the greatest percentage (36 percent or \$270.3 million) followed by motor vehicle traffic accidents (16 percent or \$125.7 million) (Table 6-9).

Hospital costs account for 38 percent of the total (\$290 million), followed by medical costs (27 percent or \$205.1 million) then allied health professionals (13 percent or \$99.3 million) (Table 6-10).

**Table 6-9 Estimated total lifetime direct cost of treatment, injury cause by level of severity, Victoria, 1993/94**

CAUSE	LEVEL OF SEVERITY			
	TOTAL \$	FATALITIES \$	HOSPITALISED \$	NON- HOSPITALISED \$
<b>TOTAL</b>	<b>758,970,747</b>	<b>11,223,271</b>	<b>646,439,566</b>	<b>101,307,910</b>
<b>UNINTENTIONAL</b>	<b>688,338,843</b>	<b>7,261,792</b>	<b>587,074,833</b>	<b>94,002,218</b>
Motor vehicle traffic	125,685,535	3,291,970	106,586,362	15,807,203
Other transport	32,234,768	301,266	28,612,331	3,321,171
Drowning/near-drowning	903,922	261,842	595,673	46,407
Poisoning	26,460,925	489,777	23,272,714	2,698,434
Falls	270,322,344	2,147,785	241,566,010	26,608,549
Fire/ flames/ burns	24,169,196	235,170	22,102,737	1,831,289
Hit/ struck/ crush	61,185,488	98,351	43,637,803	17,449,334
Cutting/ piercing	30,179,427	17,034	20,515,183	9,647,210
Asphyxia	2,300,530	139,902	1,967,601	193,027
Other	114,896,708	278,695	98,218,419	16,399,594
<b>INTENTIONAL</b>	<b>70,631,904</b>	<b>3,961,479</b>	<b>59,364,733</b>	<b>7,305,692</b>
Suicide/self-harm	40,400,122	3,512,349	35,473,411	1,414,362
IPV	26,776,345	378,486	20,841,781	5,556,078
Unknown intent	3,455,437	70,644	3,049,541	335,252

**Table 6-10 Estimated lifetime direct cost of treatment, type of expenditure by level of severity, Victoria, 1993/94.**

TYPE OF EXPENDITURE	LEVEL OF SEVERITY			
	TOTAL \$	FATALITIES \$	HOSPITALISATIONS \$	NON- HOSPITALISED \$
<b>TOTAL</b>	<b>758,970,749</b>	<b>11,223,272</b>	<b>646,435,123</b>	<b>101,307,910</b>
<b>Hospital</b>	<b>289,973,072</b>	<b>4,196,103</b>	<b>257,952,512</b>	<b>27,824,457</b>
Medical	205,140,082	2,768,352	170,795,441	31,576,290
Allied health	99,315,722	68,804	67,881,048	31,365,870
Nursing home	57,147,050		57,147,050	
Personal/home assistance	31,768,923	2,267,462	28,833,076	668,386
Equipment/aids	17,709,417	68,663	16,453,472	1,187,282
Rehabilitation	15,503,138	12,782	12,513,125	2,977,230
Pharmaceutical	11,573,185	76,381	9,693,834	1,802,970
Other direct costs	11,579,525	1,309,196	9,095,061	1,175,268

## 6.7.2 Morbidity Cost

Morbidity cost is the value of goods and services not produced because of injury-related illness and disability. To the degree that injuries prevent or reduce an individual's capacity to produce goods and services in the marketplace, the public sector, or the household, the value of these losses is borne by society. Estimates of morbidity cost involve applying earnings to work time lost and imputing a dollar value to housekeeping services for those unable to perform them. Lifetime morbidity costs include not only the short-term losses associated with hospitalisation and convalescence but also the value of output lost in the long-term by persons disabled as a result of injury that occurred in 1993/94.

Lifetime morbidity losses for persons injured in 1993/94 amount to 59,216 years or an average of 47 days per injured person. These losses equate to an estimated total morbidity cost of \$1,010.5 million, or \$2,175 per injured person. Persons aged 25-44 years account for 28 percent of all non-fatal injuries yet comprise 39 percent of total morbidity costs. Similarly, the 15-24 year group account for 22 percent of non-fatal injuries and 30 percent of morbidity costs. These two groups together account for 88 percent of hospitalised and non-hospitalised injury cases of working age (15-64 years) and therefore result in the majority of employment and housekeeping losses. The morbidity cost for the 25-44 year age-group amounts to \$396 million, or \$2,953 per injured person. For persons aged 15-24 morbidity totals almost \$306 million, or \$2,958 per injured person (Table 6-11). Again, it should be noted that the injury rate for the 15-24 year old age-group is 1.5 times that of the 25-44 year old group (see Table 5-1).

The morbidity cost for males is higher than that for females, \$594.5 million compared to \$416 million reflecting the higher number of non-fatal injuries among males. On the basis of cost per injured person, the morbidity cost for females is higher than that for males (\$2,326 compared to \$2,081). This may reflect the significantly higher morbidity for females in the 65-74 year age-group in which there is a high number of falls. The average morbidity cost for this age-group is \$7,181 for females compared to \$1,987 for males. Life years lost for injured males amounts to 38,856 compared to 20,361 for females reflecting the higher number of injuries among males. The number of days lost per injured person is 50 days for males compared to 42 for females.

Table 6-12 shows the morbidity losses by cause of injury. Morbidity losses from falls ranks highest, amounting to \$263 million, reflecting the large number of falls resulting in disability. 'Other' causes rank second in total morbidity cost at almost \$189 million. Motor vehicle traffic injuries rank third with total morbidity losses of \$155 million. Per person costs are highest for self-harm (\$8,079) and motor vehicle traffic accidents (\$4,751) reflecting the high proportion of younger age-groups affected in each case.

**Table 6-11: Injury Morbidity Losses by Age and Gender, Victoria, 1993/94.**

Age & gender	Number of Injured Persons	Time Lost (to age 75)		Morbidity Cost Estimate	
		Total life years	Per Injured Person (days)	Total (millions)	Per Injured Person
<b>Total</b>	<b>464,562</b>	<b>59,216</b>	<b>46.73</b>	<b>\$1010.501</b>	<b>\$2,175</b>
0-4	43,425	4,926	41.40	\$22.671	\$522
5-14	88,029	8,602	35.66	\$71.324	\$810
15-24	103,412	20,041	70.74	\$305.861	\$2,958
25-44	134,100	18,964	51.62	\$396.020	\$2,953
45-64	54,463	5,086	34.08	\$125.393	\$2,302
65-74	17,827	1,594	32.63	\$89.040	\$4,995
75+	21,606	0	0.00	\$0	\$0
Missing	1,699	5	1.06	\$0.192	\$113
<b>Male</b>	<b>285,664</b>	<b>38,856</b>	<b>49.64</b>	<b>\$594.465</b>	<b>\$2,081</b>
0-4	24,524	2,973	44.25	\$12.809	\$522
5-14	52,334	5,526	38.54	\$42.782	\$817
15-24	71,861	13,481	68.47	\$206.936	\$2,880
25-44	90,721	12,444	50.07	\$256.892	\$2,832
45-64	31,569	2,972	34.37	\$60.036	\$1,902
65-74	7,503	523	25.42	\$14.905	\$1,987
75+	6,108	0	0.00	\$0	\$0
Missing	1,043	3	1.00	\$0.107	\$102
<b>Female</b>	<b>178,898</b>	<b>20,361</b>	<b>41.54</b>	<b>\$416.036</b>	<b>\$2,326</b>
0-4	18,901	1,951	37.69	\$9.862	\$522
5-14	35,695	3,073	31.42	\$28.543	\$800
15-24	31,551	6,045	69.94	\$98.925	\$3,135
25-44	43,380	6,138	51.65	\$139.128	\$3,207
45-64	22,894	2,081	33.18	\$65.357	\$2,855
65-74	10,324	1,070	37.82	\$74.136	\$7,181
75+	15,498	0	0.00	\$0	\$0
Missing	656	2	1.06	\$0.085	\$130

**NOTE : Caution should be exercised when comparing total costs for non-equivalent age-groups.**

**Table 6-12: Injury Morbidity Losses by Gender and Cause, Victoria, 1993/94**

Cause of injury	Number of Injured Persons	Time Lost (to age 75)		Morbidity Cost	
		Total life years	Per Injured Person (days)	Total (millions)	Per Injured Person
<b>Total</b>	<b>464,562</b>	<b>59,216</b>	<b>46.53</b>	<b>\$1010.501</b>	<b>\$2,175</b>
Motor vehicle traffic	32,704	8,968	100.09	\$155.373	\$4,751
Other transport	17,734	3,147	64.77	\$46.368	\$2,615
Drowning	276	4	4.96	\$0.103	\$372
Poisoning	10,478	2,572	89.59	\$33.763	\$3,222
Falls	128,364	14,605	41.53	\$263.424	\$2,052
Fire/flames/burns	10,329	951	33.59	\$14.897	\$1,442
Hit/struck/crush	87,456	7,485	31.24	\$117.714	\$1,346
Cutting/piercing	47,321	4,153	32.03	\$67.188	\$1,420
Asphyxia	672	54	29.27	\$1.548	\$2,304
Other	99,416	10,745	39.45	\$188.690	\$1,898
Suicide	7,768	3,231	151.83	\$62.762	\$8,079
IPV	20,820	3,070	53.82	\$54.247	\$2,606
Unknown intent	1,224	233	69.38	\$4.424	\$3,615
<b>Male</b>	<b>285,664</b>	<b>38,856</b>	<b>49.65</b>	<b>\$594.465</b>	<b>\$2,081</b>
Motor vehicle traffic	18,803	5,583	108.38	\$91.471	\$4,865
Other transport	10,746	2,022	68.69	\$27.859	\$2,592
Drowning	228	3	4.97	\$0.086	\$379
Poisoning	5,702	1,321	84.57	\$15.226	\$2,670
Falls	64,732	8,921	50.30	\$123.083	\$1,901
Fire/flames/burns	5,964	654	40.03	\$8.891	\$1,491
Hit/struck/crush	61,629	5,918	35.05	\$90.821	\$1,474
Cutting/piercing	31,790	3,105	35.66	\$48.191	\$1,516
Asphyxia	368	27	26.37	\$0.511	\$1,391
Other	65,770	7,337	40.72	\$120.503	\$1,832
Suicide	3,437	1,338	142.04	\$23.245	\$6,762
IPV	15,706	2,461	57.19	\$41.660	\$2,652
Unknown intent	789	165	76.44	\$2.916	\$3,698
<b>Female</b>	<b>178,898</b>	<b>20,361</b>	<b>41.54</b>	<b>\$416.036</b>	<b>\$2,326</b>
Motor vehicle traffic	13,901	3,384	88.87	\$63.902	\$4,597
Other transport	6,988	1,124	58.73	\$18.509	\$2,649
Drowning	48	1	4.92	\$0.016	\$339
Poisoning	4,777	1,251	95.59	\$18.537	\$3,881
Falls	63,632	5,683	32.60	\$140.341	\$2,206
Fire/flames/burns	4,365	297	24.80	\$6.005	\$1,376
Hit/struck/crush	25,827	1,567	22.15	\$26.893	\$1,041
Cutting/piercing	15,532	1,048	24.62	\$18.997	\$1,223
Asphyxia	304	27	32.77	\$1.037	\$3,406
Other	33,645	3,408	36.97	\$68.187	\$2,027
Suicide	4,331	1,894	159.60	\$39.517	\$9,125
IPV	5,113	609	43.37	\$12.586	\$2,461
Unknown intent	435	67	56.58	\$1.508	\$3,465



### **6.7.3 Mortality Cost**

An estimated total of 1,629 deaths occurred in Victoria as a result of injury sustained in 1993/94. These deaths (which include deaths in later years) represent an estimated 48,773 life years lost to age 75, with an average loss of 30 years per death.

Applying estimates of the value of future production by age and gender to deaths resulting from injuries sustained in 1993/94, yields an estimated loss to the Victorian economy of \$813.5 million, or an average of \$499,378 per death (see Table 6-13).

#### **Gender differences**

For the 1,173 males who died from injuries, an estimated 37,872 life years were lost (to age 75) or 32 years per death, valued at \$604 million or \$514,961 per death. There is not a great deal of variation between these measures in that males represent 72 percent of all deaths, 78 percent of life years lost and 74 percent of total mortality costs (Figure 6-6).

The 456 females who died represent 10,901 life years lost or an average of 24 years per death. The estimated total production loss (paid and unpaid) for female deaths was \$209.4 million or \$459,291 per death. The difference in mortality costs between males and females is not as pronounced as in some studies (eg. Rice et al., 1990, where males represent 72 percent of deaths and life years lost yet account for 82 percent of mortality costs) because the values of future production used here assume equal value per hour for paid and unpaid work (BTCE, 1992).

#### **Age differences**

The number of injury deaths, life years lost and the mortality costs vary with age. Most victims are relatively young compared with other causes of death - over half (52 percent) are aged under 45 years. These deaths account for 83 percent of life-years lost (to age 75) to injury and represent 79 percent of total mortality costs.

Almost 30 percent of all injury deaths occur in the 25-44 year age-group (31 percent of the Victorian population). However, the number of life years lost in this age-group, a function of both age and number of deaths, represent 40 percent of all life years lost to injury. In terms of lost production, this group accounts for 44 percent of the total. However, the 15-24 year-old age-group have the highest mortality cost per death at \$813,286. This reflects the high number of deaths, and the comparatively young age of the fatalities, in this group.

In contrast, 48 percent of injury deaths occur in those aged over 45 years. These account for only 17 percent of life years lost to age 75, and 21 percent of productivity loss (see Figure 6-7).

#### **Cause of injury**

Mortality losses by cause of injury are summarised in Table 6-14 and Figure 6-8. Suicide and motor vehicle traffic accidents are the most devastating in terms of number of deaths. Together they account for 64 percent of all deaths from injuries sustained in 1993/94, 75 percent of life years lost and 76 percent of mortality costs. This reflects the fact that the majority (62 percent) of these injury deaths occur to people under the age of 45 years. Of these, 76 percent are male.

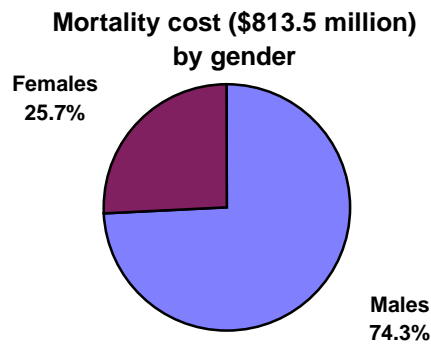
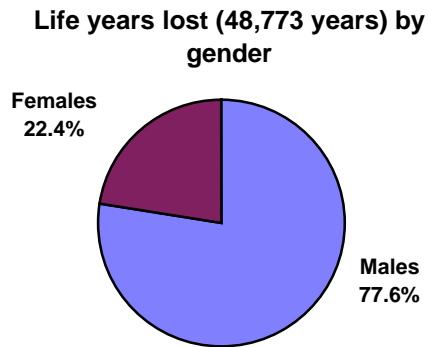
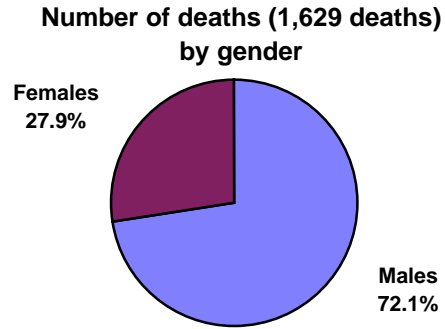
Suicide alone accounts for one third of all injury deaths, 38 percent of lost life years and 40 percent of productivity losses. The average mortality cost per death is \$597,906, the typical victim being a young male. In contrast, the lifetime productivity loss per death for falls, where the typical victim is an elderly person with low earnings and short life expectancy, is only \$97,119. Drowning has the highest number of years lost per death (46) because of the high proportion of victims aged under 5 years (30 percent) while the average number of life years lost (to age 75) for a fall death is only 5 years because of the very high proportion of elderly victims.

**Table 6-13: Injury Mortality Losses by Age and Gender, 1993/94**

Age & gender	Fatalities *	Life Years Lost (to age 75)		Mortality Cost Estimate	
	Number	Total	Per death	Total (millions)	Per death
<b>Total</b>	<b>1,629</b>	<b>48,773</b>	<b>30</b>	<b>\$813.486</b>	<b>\$499,378</b>
0-4	27	1,974	73	\$8.410	\$311,526
5-14	29	1,885	65	\$15.772	\$543,852
15-24	317	17,281	54	\$257.812	\$813,286
25-44	475	19,445	41	\$360.796	\$759,569
45-64	346	7,396	21	\$147.013	\$424,893
65-74	140	792	6	\$23.683	\$168,165
75+	295	0	0	\$0	\$0
<b>Male</b>	<b>1,173</b>	<b>37,872</b>	<b>32</b>	<b>\$604.049</b>	<b>\$514,961</b>
0-4	16	1,162	73	\$4.811	\$300,741
5-14	20	1,302	65	\$10.181	\$509,027
15-24	256	13,970	55	\$202.774	\$792,083
25-44	369	15,188	41	\$273.389	\$740,891
45-64	269	5,451	20	\$101.449	\$377,132
65-74	91	529	6	\$11.447	\$125,786
75+	152	0	0	\$0	\$0
<b>Female</b>	<b>456</b>	<b>10,901</b>	<b>24</b>	<b>\$209.437</b>	<b>\$459,291</b>
0-4	11	812	74	\$3.599	\$327,213
5-14	9	583	65	\$5.591	\$621,241
15-24	61	3,312	54	\$55.039	\$902,268
25-44	106	4,257	40	\$87.407	\$824,591
45-64	77	1,674	22	\$45.564	\$591,749
65-74	49	263	5	\$12.237	\$249,724
75+	143	0	0	\$0	\$0

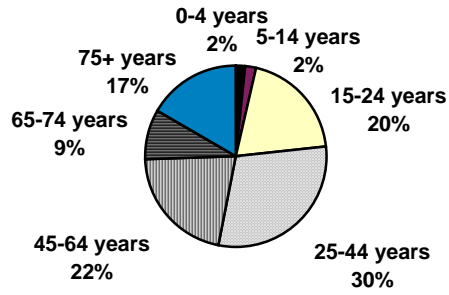
\* Includes an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Figure 6-6: Injury Mortality Losses by Gender, 1993/94.**

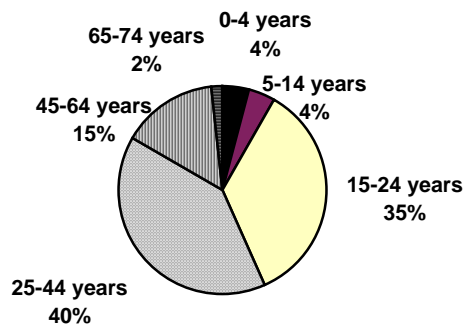


**Figure 6-7: Injury Mortality Losses by Age, 1993/94**

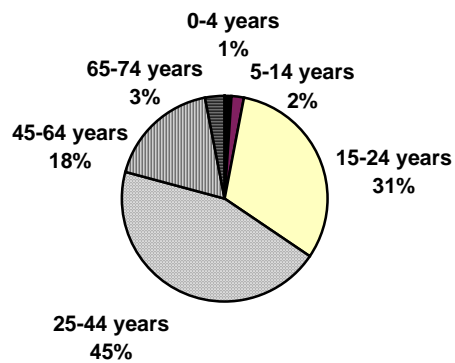
**Number of deaths (1,629 deaths)  
by age**



**Life years lost (48,773 years)  
by age**



**Mortality cost (\$813.5 million)  
by age**

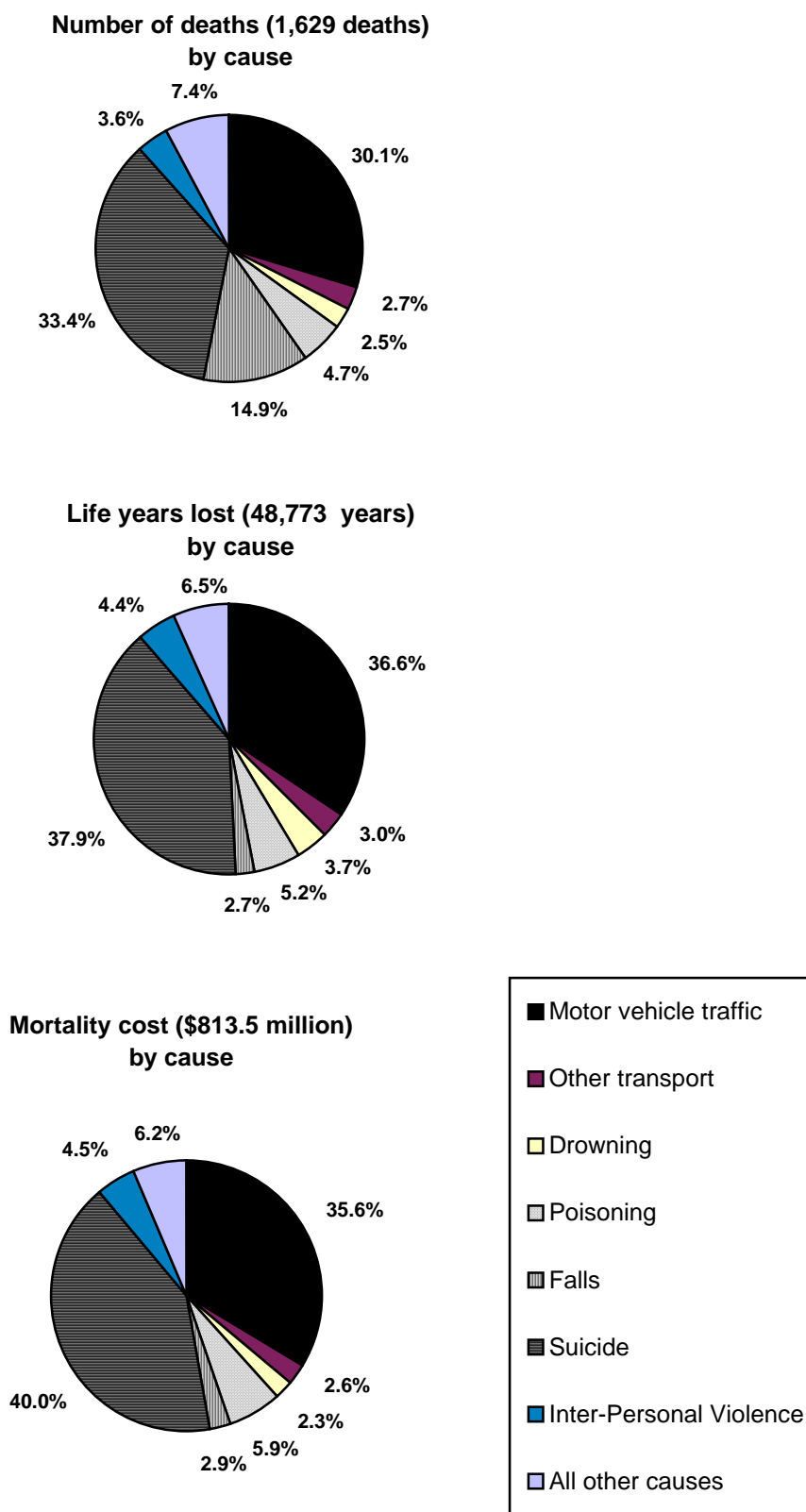


**Table 6-14: Injury Mortality Losses by Gender and Cause, 1993/94, Victoria**

Cause of injury	Fatalities*	Life Years Lost (to age 75)		Mortality Cost	
	Number	Total	Per death	Total (millions)	Per death
<b>Total</b>	<b>1,629</b>	<b>48,773</b>	<b>30</b>	<b>\$813.486</b>	<b>\$499,378</b>
Motor vehicle traffic	503	17,827	35	\$289.484	\$575,515
Other transport	44	1,486	34	\$20.880	\$474,549
Drowning	40	1,821	46	\$18.540	\$463,511
Poisoning	77	2,514	33	\$48.018	\$623,609
Falls	242	1,312	5	\$23.503	\$97,119
Fire/flames/burns	30	584	19	\$10.043	\$334,775
Hit/struck/crush	15	559	37	\$8.854	\$590,257
Cutting/piercing	3	136	45	\$2.281	\$760,224
Asphyxia	21	640	30	\$7.909	\$376,604
Other	40	884	22	\$15.169	\$379,221
Suicide	544	18,509	34	\$325.261	\$597,906
IPV	59	2,130	36	\$36.402	\$616,979
Unknown intent	11	371	34	\$7.143	\$649,347
<b>Male</b>	<b>1,173</b>	<b>37,872</b>	<b>32</b>	<b>\$604.049</b>	<b>\$520,184</b>
Motor vehicle traffic	368	13,843	38	\$212.474	\$577,376
Other transport	38	1,219	32	\$17.917	\$471,514
Drowning	29	1,193	41	\$14.018	\$483,380
Poisoning	50	1,608	32	\$28.616	\$572,329
Falls	127	1,119	9	\$19.579	\$154,166
Fire/flames/burns	18	398	22	\$6.704	\$372,438
Hit/struck/crush	15	559	37	\$8.854	\$590,257
Cutting/piercing	3	136	45	\$2.281	\$760,224
Asphyxia	15	432	29	\$5.897	\$393,118
Other	35	855	24	\$14.281	\$408,027
Suicide	429	14,767	34	\$246.223	\$573,947
IPV	38	1,488	39	\$22.537	\$593,069
Unknown intent	8	255	32	\$4.668	\$583,512
<b>Female</b>	<b>456</b>	<b>10,901</b>	<b>24</b>	<b>\$209.437</b>	<b>\$459.291</b>
Motor vehicle traffic	135	3,984	30	\$77.010	\$570,442
Other transport	6	267	45	\$2.963	\$493,769
Drowning	11	628	57	\$4.522	\$411,129
Poisoning	27	906	34	\$19.401	\$718,572
Falls	115	193	1	\$3.924	\$34,119
Fire/flames/burns	12	186	16	\$3.339	\$278,282
Hit/struck/crush	0	0	0	\$0	\$0
Cutting/piercing	0	0	0	\$0	\$0
Asphyxia	6	208	35	\$2.012	\$335,319
Other	5	29	6	\$0.888	\$177,581
Suicide	115	3,742	32	\$79.038	\$687,285
IPV	21	642	31	\$13.865	\$660,246
Unknown intent	3	116	39	\$2.475	\$824,907

• Includes an estimated 142 deaths occurring in later years as a result of injuries sustained in 1993/94.

Figure 6-8: Injury Mortality Losses by Cause, 1993/94.



Note: All other causes includes: Cutting/Piercing, Hit/Struck/Crush, Asphyxia, Fire/Flames/Burns, Unknown Intent and Other.

## 7. SOURCES OF PAYMENT (DIRECT COSTS)

The economic burden of injury is borne by various sectors of the Victorian economy. Public sources of funding include Commonwealth (including Medicare), State and local governments. Private source include private health insurance, compensation systems and individuals.

Estimates of the direct treatment cost of injury borne by these various sectors are presented here as well as information on the distribution of expenditure types among the various payers. Table 7.1 presents the estimated expenditure on direct treatment costs related to injury sustained in 1993/94 up to December 31, 1996 paid for by the TAC, WorkCover and with the balance attributed to 'other sources'. This period accounts for the major part of direct costs since the majority of cases will have recovered with little or no residual disability requiring further treatment (almost 85 percent of hospitalised and 95 percent of non-hospitalised WorkCover cases had been closed at December 31, 1996). This period accounts for 93 percent of the estimated total direct lifetime costs. This is in accord with the study by Rice et al (1989) which suggests that almost 87 percent of direct lifetime treatment costs is incurred in the first year after injury.

**Table 7-1 Direct cost of injuries sustained in 1993/94 (to 31/12/96), type of expenditure by source of payment (TAC, WorkCover & other), Victoria.**

TYPE OF EXPENDITURE	SOURCE OF PAYMENT (\$ million) Estimates to 31/12/96			
	TOTAL	TAC	WORKCOVER	OTHER
<b>TOTAL</b>	<b>711.283</b>	<b>94.064</b>	<b>68.044</b>	<b>549.197</b>
Hospital	284.015	40.008	20.146	223.861
Medical	205.140	18.826	23.096	163.218
Allied health	99.316	10.454	16.091	72.771
Nursing home	36.669	0.301	0.000	36.368
Personal/home assistance	23.500	6.158	1.757	15.585
Ambulance	15.949	5.365	0.985	9.599
Rehabilitation	14.226	1.799	2.440	9.987
Aids & appliances	12.755	2.493	1.877	8.385
Pharmaceutical	9.200	0.962	1.518	6.720
Other direct costs	10.513	7.694	0.134	2.685

During the period July 1, 1993 to December 31, 1996, the total direct treatment cost of injuries sustained in 1993/94 was estimated at \$711.281 million. While the TAC was responsible for \$94.064 million or 13 percent of the total direct cost of all injury, it is estimated that the TAC pays for approximately 75 percent of the direct treatment costs of motor vehicle traffic accidents.

WorkCover was responsible for \$68.044 million or 9.5 percent of the total direct cost of all injuries sustained in 1993/94. The actual direct treatment cost of work-related injuries is known to be much higher than this since the WorkCover scheme does not cover all workers (in particular, self-employed persons and Commonwealth employees). And, although WorkCover compensates the majority of more severe, hospitalised cases, only about 40 percent of non-hospitalised work injuries (17,661 cases of an estimated 44,187) are paid through the WorkCover scheme (as distinct from individual employers)<sup>13</sup>.

It should also be noted that during the same period the TAC and WorkCover paid out a further \$247.076 million in income support and lump sum compensation payments to persons injured in 1993/94. This consisted of \$137.096 million in income support (\$41.424 million and \$95.672<sup>14</sup> million respectively) and \$109.98 million in lump sum or common law compensation (\$24.051 million and \$81.929 million respectively). Self-insurers paid out a further \$5.407 million in income support and \$9.953 million in lump sum and common law compensation payments for work-related injury in 1993/94.

Table 7-2 presents a more detailed breakdown of the sources of payment by type of expenditure for the estimated direct cost of injury sustained in 1993/94 to December 31, 1996. Apart from the TAC and WorkCover figures (presented as a combined total in the 'Compensation systems' column), which are based on the actual payments to 31/12/96, the payments attributed to the various sectors are based on the proportion of the total health services expenditure for the whole of Australia<sup>15</sup> (Australian Institute of Health and Welfare, 1997, Table 16) adjusted for the greater contribution of the compensation sector for injury-related costs. As such, the distribution of costs between the various sectors presented here should be considered indicative only.

---

<sup>13</sup> It is estimated that self-insured employers paid out a further \$6.269 million for treatment of work-related injury in 1993/94 alone (figures derived from Appendix 3, Victorian WorkCover Authority, 1994).

<sup>14</sup> This figure includes \$0.555 million in return-to-work wage support payments by WorkCover. Income support figures quoted here include taxation payments except for a small number of workers compensation recipients who are paid directly from WorkCover rather than via their employer.

<sup>15</sup> Data for the individual states and territories is not currently available (personal communication, Tony Hynes, AIHW).



**Table 7-2 Direct cost of injuries sustained in 1993/94 (to 31/12/96), type of expenditure by source of payment, Victoria.**

Area of expenditure	Total expenditure	Government sector			Non-government sector			
		Common-wealth	State & local	Total	Health insurance funds	Individuals	Compensation systems <sup>1</sup>	Total
\$ million								
<b>Total expenditure</b>	<b>711.283</b>	<b>279.611</b>	<b>80.458</b>	<b>360.070</b>	<b>75.649</b>	<b>113.459</b>	<b>162.104</b>	<b>351.212</b>
Public hospitals	200.089	88.039	72.032	160.071	10.881	0.00	29.137	40.018
Private hospitals	83.926	4.196	0.000	4.196	40.284	8.428	31.017	79.729
Total hospitals	284.015	92.235	72.032	164.268	51.165	8.428	60.154	119.747
Medical services	205.140	142.704	0.000	142.704	4.103	16.411	41.922	62.436
Allied health	99.316	9.652	0.000	9.652	10.998	52.121	26.545	89.664
Nursing homes	36.669	24.177	3.641	27.818	0.000	8.550	0.301	8.851
Personal/home assistance <sup>2</sup>	23.500	3.055	0.000	3.055	3.525	9.005	7.915	20.445
Ambulance	15.949	0.797	4.785	5.582	1.595	2.422	6.350	10.367
Rehabilitation <sup>2</sup>	14.226	1.992	0.000	1.992	2.276	5.719	4.239	12.234
Aids & appliances	12.755	1.496	0.000	1.496	1.834	5.055	4.370	11.259
Pharmaceutical	9.200	3.341	0.000	3.341	0.074	3.304	2.480	5.858
Other direct costs <sup>3</sup>	10.513	0.000	0.000	0.000	0.000	2.685	7.828	10.513

NOTE : This table shows the estimated amounts provided by the Commonwealth government, State and local government authorities and by the non-government sector to fund expenditure on health services related to injury. Because no data is available for Victoria (personal communication, Tony Hynes, Australian Institute of Health and Welfare), the distribution of costs between sectors is derived from national data (provided in Table 16 of the Health Expenditure : Health Expenditure Bulletin No. 13, July 1997, published by the Australian Institute of Health and Welfare) adjusted to account for the larger contribution of compensation systems to the cost of treatment for injury. It is therefore indicative only of the contributions of sectors other than compensation systems.

1. The Transport Accident Commission and the Victorian WorkCover Authority.

2. The proportions for each sector (apart from compensation systems) were assumed to be the same as aids and appliances.

3. Other direct costs include mainly non-medical costs paid by the TAC and to a lesser extent by WorkCover. The remainder of the estimate has been assumed to be paid by individuals. Overall, the total is likely to be an underestimate due to variations in what is covered by the two compensation systems as the majority of cases were costed using WorkCover unit costs.



## 8. ALTERNATIVE MEASUREMENTS OF THE BURDEN OF INJURY

### 8.1 THE WILLINGNESS-TO-PAY APPROACH

Economists have relied mainly on the human capital approach for valuing the indirect cost, or foregone productivity, as a result of premature death or extended disability. This approach is based on an individual's potential lifetime earnings, discounted back to the year the injury was sustained, as a surrogate measure of his or her future productive worth if the injury had not occurred. This would be entirely appropriate if individuals were considered simply as productive entities. However, societies value the very young and the elderly, as well as the middle-aged, suggesting that attributes other than an individual's level of production are important to human values.

The willingness-to-pay approach better reflects the value placed on health and life by individuals, and is considered by many economists to be a more appropriate measure, at least from a theoretical viewpoint. This approach measures the total societal value of human life based on the amount individuals or their families are willing to pay for a change that reduces the probability of injury, illness or death (Schelling, 1968). It incorporates all aspects of well-being, including labour and non-labour income, and the value of leisure, pain and suffering. The main objection to the willingness-to-pay method has been that it requires substantial development prior to implementation, which has limited efforts to apply it (Rice et al, 1989).

Since the willingness-to-pay approach to valuing indirect cost is becoming more common, estimates of this cost in relation to injury in Victoria are provided here for reference purposes. Little work has been done in Australia to develop appropriate estimates. Consequently, the figures presented here have been derived from estimates established in overseas studies. In the first case, estimates of what people are willing to pay to avoid death, serious (hospitalised) and minor injury in New Zealand were adjusted (using international exchange rates and CPI adjustments) from those established by Jagadish Guria and associates (1993) at the New Zealand Land Transport Safety Authority (see Table 8-1). When applied to the incidence of injury in Victoria, it is estimated that Victorians may be willing to pay almost \$2.45 billion a year (see Table 8-2) to prevent all injury deaths and \$10.5 billion to prevent all non-fatal injuries, a total of \$12.95 billion annually. In comparison, willingness-to-pay figures derived from work by Miller (BTCE, 1994) in the United States, yields an estimate of \$5.7 billion annually to prevent all injury deaths in Victoria and almost \$21.6 billion to prevent all non-fatal injuries, a total of \$27.3 billion.

**Table 8-1 : Adjusted person costs - willingness-to-pay**

Level of injury	Willingness-to-pay estimates (adjusted to 1993 \$A)	
	Guria (1993)	Miller, (BTCE 1994)
Killed	\$1,503,860	\$3,499,000
Hospitalised	\$120,310	\$147,440
Medical treatment only	\$6,015	\$29,290

**Table 8-2: Total indirect cost estimates - willingness-to-pay**

Level of injury	Willingness-to-pay estimates (1993 \$A billion)	
	Guria (1993)	Miller (BTCE 1994)
	Killed	\$2.450
Hospitalised	\$8.109	\$9.938
Medical treatment only	\$2.389	\$11.634
<b>TOTAL</b>	<b>\$12.948</b>	<b>\$27.272</b>

It is clear that the human capital approach yields significantly lower estimated values of human life than does the willingness-to-pay method. Economic losses to society may be approximated by lost productivity. However, the discounted future earnings figure arrived at by the human capital approach generally underestimates the total perceived loss to the individual. Human capital estimates represent the absolute lower boundary of willingness-to-pay estimates, but may only be within a factor of 2 or 3 (perhaps even 5 or 10) of what a person or his/her family feel they actually lose if death or permanent disablement occur as a result of injury (Hartunian, Smart & Thompson, 1975). Both sets of estimates are presented in this report to provide the reader with the best estimates available using each approach.

## 8.2 LIFE-YEARS LOST

Overall, it is estimated that a total of 107,989 life-years (to age-75) were lost as a result of injuries sustained in 1993/94. Of these, 45 percent were lost as a result of premature death (mortality) with the remaining 55 percent lost as a result of hospitalisation, recuperation and disability due to injury (morbidity) (see Table 8-3).

Males accounted for the greater proportion of total life-years lost (71 percent), more than 2.5 times that of females. In terms of life-years lost due to premature death (mortality), males accounted for almost 3.5 times that of females. Males also accounted for almost twice as many life-years lost as a result of morbidity due to injury.

Overall, motor vehicle traffic accidents account for the greatest number of potential life-years lost (26,795) followed by suicide/self-harm (21,740) and falls (15,917). Suicide/self-harm accounts for the greatest number of life-years lost due to premature death (18,509) because of the high number of deaths and the relatively young age of victims. Falls account for the greatest number of life-years lost to disability (14,605) due to the large number of cases and the high proportion of elderly victims who often require lengthy hospitalisation and recuperation.

## 8.3 OTHER QUALITY OF LIFE MEASURES

The estimated value of foregone quality of life can be described by a measure of health status such as the “quality adjusted life year, or QALY. QALYs (and variants such as the World Health Organisation and World Bank’s “disability adjusted life years - Murray, 1994; Murray & Lopez, 1994) are scales that value a year in any given health state between death (with value 0) and perfect health (with value 1), based on a representative individual’s preferences among different health states. QALYs reflect not only years of life saved but also the degree of functioning and health during those years. A dollar value can be placed on these measures for the purpose of cost benefit analysis (Miller & Levy, 1997).

**Table 8-3 Potential life-years lost by severity of injury, age and gender, Victoria, 1993/94.**

Age & gender	Fatalities			Non-fatal injuries			ALL INJURIES		
	No. of fatalities	Life years lost (to age 75)		No of non-fatal injuries	Time lost (to age 75)		All injuries	Time lost (to age 75)	
		Total (years)	Per death (years)		Total (years)	Per injured person (days)		Total (years)	Per injured person (days)
<b>Total</b>	<b>1,629</b>	<b>48,773</b>	<b>29.94</b>	<b>464,562</b>	<b>59,216</b>	<b>47</b>	<b>466,191</b>	<b>107,989</b>	<b>85</b>
0-4	27	1,974	73.11	43,425	4,926	41	43,452	6,900	58
5-14	29	1,885	65.00	88,029	8,602	36	88,058	10,487	43
15-24	317	17,281	54.51	103,412	20,041	71	103,729	37,322	131
25-44	475	19,445	40.94	134,100	18,964	52	134,575	38,409	104
45-64	346	7,396	21.38	54,463	5,086	34	54,809	12,482	83
65-74	140	792	5.66	17,827	1,594	33	17,967	2,386	48
75+	295	0	0	21,606	0	0	21,901	0	0
Missing				1,699	5	1	1,699	5	1
<b>Male</b>	<b>1,173</b>	<b>37,872</b>	<b>32.29</b>	<b>285,664</b>	<b>38,856</b>	<b>50</b>	<b>286,837</b>	<b>76,728</b>	<b>98</b>
0-4	16	1,162	72.63	24,524	2,973	44	24,540	4,135	62
5-14	20	1,302	65.10	52,334	5,526	39	52,354	6,828	48
15-24	256	13,970	54.57	71,861	13,481	68	72,117	27,451	139
25-44	369	15,188	41.16	90,721	12,444	50	91,090	27,632	111
45-64	269	5,451	20.26	31,569	2,972	34	31,838	8,423	97
65-74	91	529	5.81	7,503	523	25	7,594	1,052	51
75+	152	0	0	6,108	0	0	6,260	0	0
Missing				1,043	3	1	1,043	3	1
<b>Female</b>	<b>456</b>	<b>10,901</b>	<b>23.91</b>	<b>178,898</b>	<b>20,361</b>	<b>42</b>	<b>179,354</b>	<b>31,262</b>	<b>64</b>
0-4	11	812	73.81	18,901	1,951	38	18,912	2,763	53
5-14	9	583	64.78	35,695	3,073	31	35,704	3,656	37
15-24	61	3,312	54.30	31,551	6,045	70	31,612	9,357	108
25-44	106	4,257	40.16	43,380	6,138	52	43,486	10,395	87
45-64	77	1,674	21.74	22,894	2,081	33	22,971	3,755	60
65-74	49	263	5.37	10,324	1,070	38	10,373	1,333	47
75+	143	0	0	15,498	0	0	15,641	0	0
Missing				656	2	1	656	2	1

**NOTE : Caution is required in interpreting data from non-equivalent age-groups.**

**Table 8-4 Potential life-years lost by gender, severity and cause of injury, Victoria, 1993/94.**

Cause of injury	Fatalities			Non-fatal injuries			ALL INJURIES		
	No. of fatalities	Life years lost (to age 75)		No of non-fatal injuries	Time lost (to age 75)		All injuries	Time lost (to age 75)	
		Total (years)	Per death (years)		Total (years)	Per injured person (days)		Total (years)	Per injured person (days)
<b>Total</b>	<b>1,629</b>	<b>48,773</b>	<b>30</b>	<b>464,562</b>	<b>59,216</b>	<b>47</b>	<b>466,191</b>	<b>107,989</b>	<b>85</b>
Motor vehicle traffic	503	17,827	35	32,704	8,968	100	33,207	26,795	295
Other transport	44	1,486	34	17,734	3,147	65	17,778	4,633	95
Drowning	40	1,821	46	276	4	5	316	1,825	2,108
Poisoning	77	2,514	33	10,478	2,572	90	10,555	5,086	176
Falls	242	1,312	5	128,364	14,605	42	128,606	15,917	45
Fire/flames/burns	30	584	19	10,329	951	34	10,359	1,535	54
Hit/struck/crush	15	559	37	87,456	7,485	31	87,471	8,044	34
Cutting/piercing	3	136	45	47,321	4,153	32	47,324	4,289	33
Asphyxia	21	640	30	672	54	29	693	694	365
Other	40	884	22	99,416	10,745	39	99,456	11,629	43
Suicide	544	18,509	34	7,768	3,231	152	8,312	21,740	955
IPV	59	2,130	36	20,820	3,070	54	20,879	5,200	91
Unknown intent	11	371	34	1,224	233	69	1,235	604	179
<b>Male</b>	<b>1,173</b>	<b>37,872</b>	<b>32</b>	<b>285,664</b>	<b>38,856</b>	<b>50</b>	<b>286,837</b>	<b>76,728</b>	<b>98</b>
Motor vehicle traffic	368	13,843	38	18,803	5,583	108	19,171	19,426	370
Other transport	38	1,219	32	10,746	2,022	69	10,784	3,241	110
Drowning	29	1,193	41	228	3	5	257	1,196	1,699
Poisoning	50	1,608	32	5,702	1,321	85	5,752	2,929	186
Falls	127	1,119	9	64,732	8,921	50	64,859	10,040	57
Fire/flames/burns	18	398	22	5,964	654	40	5,982	1,052	64
Hit/struck/crush	15	559	37	61,629	5,918	35	61,644	6,477	38
Cutting/piercing	3	136	45	31,790	3,105	35	31,793	3,241	37
Asphyxia	15	432	29	368	27	26	383	459	437
Other	35	855	24	65,770	7,337	41	65,805	8,192	45
Suicide	429	14,767	34	3,437	1,338	142	3,866	16,105	1,521
IPV	38	1,488	39	15,706	2,461	57	15,744	3,949	91
Unknown intent	8	255	32	789	165	76	797	420	192
<b>Female</b>	<b>456</b>	<b>10,901</b>	<b>24</b>	<b>178,898</b>	<b>20,361</b>	<b>42</b>	<b>179,354</b>	<b>31,262</b>	<b>64</b>
Motor vehicle traffic	135	3,984	30	13,901	3,384	89	14,036	7,368	192
Other transport	6	267	45	6,988	1,124	59	6,994	1,391	73
Drowning	11	628	57	48	1	5	59	629	3,891
Poisoning	27	906	34	4,777	1,251	96	4,804	2,157	163
Falls	115	193	1	63,632	5,683	33	63,747	5,876	16
Fire/flames/burns	12	186	16	4,365	297	25	4,377	483	40
Hit/struck/crush	0	0	0	25,827	1,567	22	25,827	1,567	22
Cutting/piercing	0	0	0	15,532	1,048	25	15,532	1,048	25
Asphyxia	6	208	35	304	27	33	310	235	277
Other	5	29	6	33,645	3,408	37	33,650	3,437	37
Suicide	115	3,742	32	4,331	1,894	160	4,446	5,636	463
IPV	21	642	31	5,113	609	43	5,134	1,251	89
Unknown intent	3	116	39	435	67	57	438	183	153

## 9. DISCUSSION

The incidence and lifetime cost estimates for injury in Victoria presented in this report are conservative estimates based on currently available data and commonly used methodologies. This study utilised information from various sources, but in some cases estimates are necessarily made on the basis of limited data and the assumptions, caveats, etc. have been clearly indicated in the text. However, the estimates developed in this study are the best estimates based on currently available data.

It is clear from the results of this study that injuries have a significant impact on the Victorian community, health care system and economy in general. The impact of disability due to injury on the individual and his/her family can be personally and economically devastating. The cost of injury is also a significant burden to the community with the lifetime cost for persons injured in a single year (1993/94) totalling \$2,583 million. Direct treatment and related costs alone account for at least \$759 million with indirect costs (mortality and morbidity) accounting for a further \$1,824 million and almost 108,000 life-years (to age 75). All sectors of the Victorian economy share this burden, including federal, state and local governments, the private sector and individuals.

### 9.1 VALIDATION

Lifetime direct or treatment costs are considerable at \$759 million. This figure is not incompatible with estimates by the Australian Institute of Health and Welfare for Australia in 1993/94 (Mathers, Penm, Carter & Stevenson, 1997). This study estimated the direct cost of health services by taking known recurrent expenditures on health services and apportioning them to disease categories (on the basis of the ICD-9 CM chapters) using data on utilisation of health services by disease type and costs per service. It estimated that the total treatment cost of injury and poisoning<sup>16</sup> for Australia in 1993/94 was \$2,571 million. If we assume that one-quarter of those costs were incurred in Victoria (on the basis of population), the estimate for Victoria is about \$643 million for that year. This figure includes the cost of medical misadventure and the adverse effects of prescription medication which have been excluded from the current study. The lifetime cost of treatment estimate of \$759 million from the current study is not unreasonable in comparison.

The BTCE (1992) estimated that the total cost of road accidents in Australia in 1988 was \$6.1 billion. This figure has remained stable with 1993 costs estimated at the same value (Lynch, 1994). However, this estimate includes costs associated with vehicle damage (\$1.868 billion), pain and suffering (\$1.463 billion) and insurance administration (\$571 million). When these costs are factored out to approximate the costs included in this study, the remainder (consisting of direct treatment costs, lost earnings and family and community losses) totals \$2.232 billion. If again, we assume that one quarter of these costs were incurred in Victoria, the cost of motor vehicle accidents in Victoria is estimated at \$558 million. This corresponds well with the estimate from this study of \$571 million.

Despite variations in the methods used to calculate the different types of cost between this study and the US study (Rice et al, 1989), direct cost, morbidity and mortality account for similar proportions of the total lifetime costs in each case. In this study, direct costs account for 29 percent of the total, morbidity for 39 percent and mortality for 31 percent. In the US study, direct costs accounted for 29 percent of the total with morbidity accounting for 41 percent and mortality for 30 percent.

---

<sup>16</sup> Total direct costs attributed to injury and poisoning for Australia in the financial year 1993/94 was almost \$2,607 million. For comparative purposes we have deducted the cost of research (estimated at \$35.558 million) since this cost category was not included in this study.

## 9.2 INJURY AS A PUBLIC HEALTH ISSUE

In establishing the economic cost of injury, this study provides another measure of the importance of injury as a public health issue, over and above the usual epidemiological estimates of morbidity and mortality. At \$2.6 billion the lifetime cost of injury is considerable representing almost 3 percent of the Victorian Gross State Product for 1993/94 (Australian Bureau of Statistics, 1997). While it has not been possible to compare the results of this study against lifetime costs of other major disease groups (since we are unaware of any comparable studies in Victoria), injury has been shown to rank fourth behind circulatory, musculo-skeletal and mental disorders in terms of direct health care costs in Australia (Mathers, Penm, Carter & Stevenson, 1997). It also ranks third, in terms of number of deaths, behind circulatory disease and cancers and second, in terms of potential years of life lost to age 75, behind cancers (Mathers, Penm, Carter & Stevenson, 1997). However, injury ranks, first ahead of cancer and circulatory disease, if considering life-years lost to age 65 (Ginpil et al, 1992; cited in Harrison, 1995).

## 9.3 POSSIBLE PRIORITIES FOR PREVENTION

Decisions about priorities for health promotion and illness/injury prevention should be made on the basis of “information about : the public health significance of the disease condition (e.g. as measured by cost-of-illness, morbidity and mortality indicators); the theoretical preventability (efficacy) and practical preventability (effectiveness) of the disease; and the relative cost-effectiveness (efficiency) of individual preventive measures aimed at achieving the potential for prevention” (Harris et al., 1995).

While all these factors should be considered in determining priorities for injury prevention, this study identifies the following groups as over-represented in epidemiological or cost terms :

- Suicide is the leading cause of injury death in Victoria followed by motor vehicle traffic accidents. As such these two causes also account for the highest mortality costs.
- Falls are the leading cause of non-fatal injury in Victoria. Falls account for the highest total direct treatment costs and highest overall morbidity costs.
- Males are over-represented in terms of incidence. While they represent 49.5 percent of the population, they sustain 62 percent of all injuries. Almost three-quarters of injury fatalities and over 60 percent of non-fatal injuries occur among males.
- Young people aged 15-24 years are over-represented in both epidemiological and cost terms. This age-group accounts for 16 percent of the Victorian population yet accounts for 22 percent of all injuries and almost 28 percent of the total lifetime cost. Persons in this age-group also have the highest per person mortality costs averaging \$813,286 per death.
- Adults aged 25-44 are over-represented in terms of cost. Although this age-group represents 31 percent of the total Victorian population and accounts for a similar percentage of all injuries (29 percent), persons aged 25-44 years account for 37 percent of the total lifetime costs of injury.
- Drowning/near-drowning have the highest average lifetime cost at \$61,866 per person followed by suicide/self-harm at \$51,540 per person.
- Elderly persons over the age of 75 years have the highest direct treatment costs averaging \$5,048 per injured person. This is due mainly to the high number of falls suffered in this age group.
- Most injuries, at all levels of severity, occur in the home.



- In terms of activity, sports and leisure activities are responsible for the greatest number of non-fatal injuries.

## **9.4 ALLOCATION OF RESOURCES**

While economic cost provides another measure of the impact of injury on the community, cost alone should not be used to determine whether or not more resources should be allocated to the prevention of injury in general or in determining priorities within the injury area.

This study provides several measures of the burden of injury which should be used in conjunction with each other to compare the impact of injury relative to other health issues and to determine priorities within injury prevention. Chapters 5 and 6 provide comprehensive epidemiological and cost data for the major injury cause categories as well as detailed disaggregations by age and gender.

As indicated in the previous section, preventability is an important factor in determining priorities for injury prevention. Future decisions on the allocation of health-care resources for injury prevention should depend on the availability of prevention options, their cost and effectiveness. This study provides baseline data against which interventions can be assessed as it provides incidence-based cost estimates which model the current care option. Resources for injury prevention are also required from those sectors in which the injuries are incurred and within whose jurisdiction action is required to implement interventions.

Since there are concerns about the validity of considering productivity losses (indirect costs) as an economic consequence of disease (see Chapter 2), total lifetime costs have also been disaggregated by type : direct, morbidity and mortality. The separate components of the direct costs have also been identified as this may help policy makers and other interested parties identify the sectors on which the major burden falls.

The cost of injury data presented here is of relevance, not only to the health sector and to other sectors which pay the costs but also, to those in which the costs are incurred. Arguably, the costs result from failures in those sectors which have the responsibility as well as the jurisdiction for prevention.

It should be pointed out that considered investment in safety has already been shown to be cost effective in the road transport area. The benefits of a concerted, targeted and multi-faceted approach to road safety has been demonstrated through the progressive reduction in traffic fatalities in Victoria during the past 27 years, including a dramatic reduction of 49 percent between 1989 and 1992, which has been maintained since. Evaluations of the effectiveness of programs directed at drink driving and excessive speed during 1989-92 have shown benefits in terms of reductions in the cost of serious casualty crashes considerably more than ten times the program costs (Cameron, 1995).

## **9.5 DISSEMINATION**

This report provides an overview of the data prepared for this study. The complete dataset, held at Monash University Accident Research Centre, provides a wealth of detailed information on which additional studies could be based. The methodology developed could be applied to more specific areas such as the costs of dog bite, playground, farm, horse-riding injuries and so on.

Journal articles based on this study will be submitted to international journals in 1998. Papers will also be presented at national and international conferences. Major findings from the study will also appear in the 1998 Victorian Year Book published by the Australian Bureau of Statistics.



## 10. RECOMMENDATIONS

Several recommendations have emerged from this study for the prevention and control of injury in Victoria and for further research on the incidence and cost of injury.

### 10.1 INJURY PREVENTION AND CONTROL

- It is clear that, in terms of cost alone, injury is responsible for an enormous burden to the state of Victoria. It is recommended that more resources be directed towards the prevention of injuries and the reduction of their effects through the application of existing knowledge and the development and evaluation of new strategies.
- It is recommended that research and controlled experiments be conducted to evaluate the effectiveness and cost savings of a range of injury control interventions and that programs that are shown to be cost-effective be implemented.
- There is evidence for the effectiveness of a number of injury prevention strategies. It is recommended that research be conducted to evaluate the economic and/or societal barriers to the application of such strategies.

#### 10.1.1 Data issues

##### Incidence data

- Fundamental to any cost of illness study is the establishment of reliable estimates of incidence. The provision of identified data (in the form of unique patient identifiers) across the current DHS collections would link data within and between collections, allowing the identification of episodes of care for a single injury event, thereby reducing the risk of double-counting. Linkage of data also provides a data quality control function and enhances the level of detail available on individual cases. It is therefore recommended that the linkage of emergency department injury surveillance and hospital admission data sets should be undertaken to provide reasonably comprehensive information on moderate and severe injury cases (admissions). Linkage of these systems with the Coronial Services database would also provide important additional information, particularly in relation to service utilisation, for fatalities. Issues of confidentiality could be addressed by removing identifying data immediately after use and by enforcing strict guidelines regarding data linkage.
- Consumer product-related injury is a substantial issue generally hidden within the global injury problem because of the lack of detail provided by current hospital-based collections. It is recommended that injury surveillance should include product-related data in sufficient detail to provide useful in-depth analyses and reliable trend data in this area. Few products can be identified using the ICD 9 or 10 coding systems.
- Impairment classification systems (for estimating outcome) are still under development. They rely on the quantification of injury severity. It is recommended that injury severity be routinely coded with the diagnoses or reliable electronic conversions should be developed for ICD 10 codes.
- Longitudinal data are increasingly essential to provide dynamic descriptions of injury and the short-term and long-term consequences of injury on the individual, their family and the community. Very few longitudinal studies have been conducted to provide improved estimates of lifetime costs. It is recommended that use be made of existing data sets, such as those held by the TAC and WorkCover, to explore the long-term effects of particular types of injury.

## Cost data

- It is recommended that the possibility of linking hospital accounts data to VIMD data be investigated and made available to researchers to enable the comprehensive costing of injury within the hospital sector.
- The Victorian WorkCover Authority and the Transport Accident Commission both provide a rich source of cost data for injury. It is recommended that a cost matrices (type of injury by body part) for both motor vehicle traffic injuries and all other injuries, using several years of data for robustness, be developed to provide a tool for costing studies in the future. Adjustment factors for multiple versus single injuries could also be determined. This could be updated annually by returning to the data sources or applying an adjustor based on the CPI or the movement in average payments within the payment authorities.
- Payments data for children and the elderly are only available for motor vehicle injuries. It is recommended that alternate sources of data be explored to fill this gap. Alternate sources of cost data such as the Australian Army which maintains complete medical records (including costs) for all personnel and their dependants is a possible source of comprehensive cost data for child injury. Veterans Affairs may also be able to provide relevant costing for elderly patients. However, this may not reflect the general elderly population due to Veterans Affairs eligibility criteria.
- Non-hospitalised injury, although usually relatively inexpensive in terms of treatment cost and morbidity represents the majority of injury cases. The costing of non-hospitalised injury is particularly difficult given that the WorkCover and Transport Accident Commission data apply to the more serious end of the spectrum due to the application of a medical excess. It is recommended that a study be conducted to investigate alternative methods of estimating the treatment costs associated with non-hospitalised injury and to determine the real extent of morbidity given that the measures used in this study were particularly conservative.

### 10.1.2 Further research

- In view of the suspected large number of deaths in the elderly due to falls, which may have been omitted in this study, it is recommended that a further study be undertaken to estimate the true magnitude of this issue.
- The breakdown provided in Table 6-8 indicates that sport and recreational activities result in a high number of injuries. A separate study on sports and active recreation is recommended, to identify the costs of such injury, since these categories are hidden within the thirteen cause groups specified here. As shown in Table 6-8, the data is capable of separate analyses to identify sporting and recreational injuries, however there is a need to include specialist sports medicine clinics in the injury surveillance to develop a more complete estimate of the incidence of sports injury.
- While this study provides an estimate of the total economic cost of, and life-years lost to, injury in Victoria, a study based on alternative measures such as QALYs or DALYs is recommended to complete the picture by providing information about quality of life aspects of the total societal burden of injury.

## 11. REFERENCES

- Anderson M & Ross B. Labour force projections and tables of working life : a preliminary investigation. Paper presented at the 16th Conference of Economists, Surfers Paradise. 1987
- Australian Bureau of Statistics. Causes of Death Australia, 1994. AGPS; 1995; Cat. No. 3303.0
- Australian Bureau of Statistics. Estimated resident population by sex and age : States and Territories of Australia, June 1993. AGPS; 1993; Cat. No. 3201.0
- Australian Bureau of Statistics. Focus on families. Work and family responsibilities. ABS Canberra; 1994c; Cat. No.4422.0
- Australian Bureau of Statistics. Labour Statistics Australia 1988. ABS Canberra; 1990a; Cat. No. 6101.0
- Australian Bureau of Statistics. Labour Statistics Australia 1993. ABS Canberra; 1994b; Cat. No. 6101.0
- Australian Bureau of Statistics. Measuring unpaid Household Work : Issues and Experimental Estimates. ABS Canberra; 1990b; Cat. No. 5236.0
- Australian Bureau of Statistics. Occasional paper. Unpaid work and the Australian economy. ABS Canberra; 1994d; Cat. No.5240.0
- Australian Bureau of Statistics. Weekly Earnings of Employees (Distribution) Australia, August 1988. ABS Canberra; 1988; Cat. No. 6310.0
- Australian Bureau of Statistics. Weekly earnings of employees (distribution) Australia, August, 1993. ABS Canberra; 1994a; Cat. No. 6310.0
- Australian Bureau of Statistics. 1995-96 Australian National Accounts : State Accounts. ABS, 1997, Cat. No. 5220.0.
- Australian Bureau of Statistics. 1998 Victorian Year Book. ABS, 1998, Cat. No. 1301.2
- Australian Institute of Health and Welfare. Health expenditure : Health expenditure bulletin No. 13. July 1997.
- Better Health Commission. Looking forward to better health. Australian Government Publishing Service. 1986
- Bureau of Transport and Communication Economics & Environmental Protection Agency Victorian Transport Externalities Study. Vol. 1 The costing and costs of transport externalities in selected countries : A review. EPA Melbourne; 1994; Publication No. 415
- Bureau of Transport and Communication Economics. Valuing Transport Safety in Australia; 1996; Working Paper 26.
- Bureau of Transport and Communication Economics. Social cost of transport accidents in Australia. BTCE Report No. 79. Canberra : Australian Government Publishing Service; 1992
- Cameron, M. Economic analysis : an essential tool. 1995, Commonwealth Dept. of Human Services and Health, Proceedings from the First National Conference on Injury Prevention and Control.

Cameron P, Dziukas L, Hadj A, Clark P, & Hooper S. Patterns of injury from major trauma in Victoria. *Australian & New Zealand Journal of Surgery*; 1995; 65, 848-852

Cameron P, Dziukas L, Hadj A, Hooper S and Clark, P. *Victorian Major Trauma Study II*; 1995

Commission on Professional and Hospital Activities. *Annotated International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)*; Ann Arbor, Michigan; 1986; Fourth Printing.

Day L, Valuri G, and Ozanne-Smith J. *General practice injury surveillance in the Latrobe Valley*; Monash University Accident Research Centre; 1997; Report No. 113.

Drummond, MF. *Cost-of-illness studies : a major headache?*; 1992; *PharmacoEconomics* 2 : 1-4 .

European Transport Safety Council. *Transport Accident Costs and the Value of Safety*. 1997, European Transport Safety Council, Brussels.

Gillett S, Liu Z, Solon R. *Hospital utilisation and costs study 1989-90, Volume 2*. Canberra : Australian Institute of Health and Welfare, Health Services, series no. 4, AGPS, 1993

Ginpil S, Schneider R and Stone S. *Potential life-years lost through road crashes : 1990. A comparison with other causes of death*. 1992, Canberra : Federal Office of Road Safety.

Guria JC. *Social costs of transport accidents*. 1992, Land Transport Division, Ministry of Transport, Wellington, New Zealand.

Harris AH, Clark RB, Veriokios G, Carter R, Dunt, D and Crowley S. *Monitoring the national road safety strategy : cost-effectiveness of road safety measures*. 1995, Canberra : Federal Office of Road Safety, Report No. CR 157.

Harrison J. *Australian injury data. Injury Research and Prevention : a text*. (Edited by J. Ozanne-Smith and F. Williams). 1995, Monash University Accident Research Centre.

Hartunian NS, Smart CN and Thompson MS. *The incidence and economic costs of major health impairments. A comparative analysis of cancer, motor vehicle injuries, coronary heart disease, and stroke*; Lexington, MA : Lexington Books, D.C. Heath and Co; 1981

Health Insurance Commission; 1994; *Medicare & Pharmaceutical Benefits Statistical Tables. Sources :* (Table 8 Medicare : Average value of benefits per service by broad type of service & Table 9 Medicare : Number and percentage of services direct billed by broad type of service).

Henry, DA. *The Australian guidelines for the subsidisation of pharmaceuticals*; 1992; *PharmacoEconomics* 2 : 422-424.

Industry Commission. *Work, health and safety: An inquiry into occupational health and safety*; Canberra: Industry Commission; 1992; Draft Report Volume 2

Jackson, Sevil, Tate & Collard. *The development of relative resource weights for non-admitted patients*. Table 5, p.23. AIHW/NCHPE Technical Report No. 6. May, 1995.

Jackson T, Tate R, Henderson N, Carlin J and Bayliss-McCulloch J. *1994 Victorian cost weights. A study of fifteen hospitals' patient-level AN-DRG costs*. Melbourne : Victorian Department of Health & Community Services; 1994

Jones-Lee MW. *The value of transport safety*. *Oxford Review of Economic Policy*; 1992; Vol. 6, No.2.

Kneisner, TJ and Leeth, JD. Compensating wage differentials for fatal injury risk in Australia, Japan and the United States. 1991, *Journal of Risk and Uncertainty*, 4 : 75-90.

Koopmanschap MA. Complementary analyses in economic evaluation of health care; Erasmus University, Rotterdam 1994; Ph.D. Thesis

Lynch, M. Savage economics of road crashes. 1994, *The Financial Review*, 7/12/94 : 14.

Mathers C, Penm R, Carter R and Stevenson C. Health system costs of diseases and injury in Australia 1993-94. Information Paper. Canberra : Australian Institute of Health and Welfare, 1997.

Max W, Rice DP & MacKenzie EJ. The lifetime cost of injury. *Inquiry*, Vol. 27, Winter.

McClure, RJ & Ozanne-Smith EJ. Injury management by GPs in Australia. (letter) *The British Journal of General Practice*; 1996 Jan; p. 47

Miller TR and Guria JC. The Value of Statistical Life in New Zealand. Land Transport Division, Ministry of Transport, Wellington, New Zealand; 1991

Miller TR and Levy DT. Cost outcome analysis in injury prevention and control : a primer on methods. 1997, *Injury Prevention*, 3 : 288-293.

Murphy G, Brown D, Athanasou J, Foreman P, and Young A. Labour force participation and employment among a sample of Australian patients with a spinal cord injury. 1997; *Spinal Cord*, 35 : 238-244.

Murray CJL. Quantifying the burden of disease : the technical basis for disability-adjusted life years. *Bulletin of the World Health Organisation*, 1994, 72: 429-445

Murray CJL and Lopez, AD. Quantifying disability : data, methods and results . *Bulletin of the World Health Organisation*, 1994,. 72: 481-494.

National Injury Surveillance Unit. Injury Mortality Australia 1994. *Australian Injury Prevention Bulletin*; 1996; Issue 13, October 1996; AIHW Cat. No. INJ1

Nutbeam D, Wise M, Bauman, A et al. Goals and targets for Australia's health in the year 2000 and beyond, 1993; Commonwealth Department of Health, Housing and Community Services

O'Connor PJ & KPMG Peat Marwick. Incidence of hospital Emergency Department attendances for road injury, 1993, AIHW National Injury Surveillance Unit & the Federal Office of Road Safety.

RCG/Hagler Bailly. The health effects and health costs in Melbourne due to motor vehicle-sourced ozone and air toxics; 1994; In *Victorian Transport Externalities Study*. Vol. 2. Transport Externalities in Victoria. EPA. Victoria

Rice DP, MacKenzie EJ and Associates. Cost of injury in the United States : A report to Congress; 1989; San Francisco, CA Institute for Health & Aging, University of California and Injury Prevention Center, The Johns Hopkins University.

Schelling, TC. The life you save may be your own. In *Problems in public expenditure analysis*; 1968; Ed. S.B. Chase. Washington, DC : Brookings Institution , pp. 127-176

State Coroner's Office. Unnatural Deaths, collated from the findings of the State Coroner, 1993/94; 1996; State Coroner's Office, Victoria, Australia

Victorian WorkCover Authority. Victorian WorkCover Authority 1993-94 Annual Report. 1994.

Walsh J. Costs of spinal cord injury in Australia; 1988; Paraplegia, 26, 380-388

Watson W.L. & Ozanne-Smith J. (1995) Consumer product-related injury in Australia : Direct hospital & medical costs to government. MUARC Report No. 83.

Watt GM. Hospitalised injuries Victoria, July 1987-June 1993. Monash University Accident Research Centre; 1995; Report No.67

Whiteneck GG, Charlifue SW, Frankell HL, Fraser MH, Gardner BP et al. Mortality, morbidity, and psychosocial outcomes of persons spinal cord injured more than twenty years ago; 1992; Paraplegia, 30, 617-630.



## **APPENDICES**



## **APPENDIX A**

### **CAUSE CATEGORIES : E-CODE GROUPINGS**



**Appendix Table A1 Cause Groups (E-Code Categories)**

Cause of Injury (Grouped)	Cause of Injury (value and label)	ICD 9 E-codes
<b>Motor Vehicle Traffic</b>	1. Motor vehicle traffic	810 - 819
<b>Motor Vehicle Non-Traffic</b>	2. Motor vehicle non-traffic	820 - 825
	3. Non-motor road vehicle	826 - 829
	4. Railway transport	800 - 807
	5. Water transport	830 - 838
	6. Air transport	840 - 845
	7. Vehicles nec	846 - 848
<b>Drowning</b>	8. - 13. Accidental Drowning and submersion	910
<b>Poisoning</b>	14. Opiates and related	850.0 - 850.2
	15. Non-opiate analgesic/ antipyretic/ antirheumatic	850.3 - 850.8
	16. Barbiturates	851
	17. Non-barbiturate sedatives/ hypnotics	852
	18. Tranquillisers	853
	19. Anit-infectives	856 - 857
	20. Other /unspecified drug, etc.	850.9, 854 - 855, 858
	21. Alcoholic beverages, ethanol	860.0 - 860.1
	22. Petroleum products, solvents	862
	23. Agricultural & horticultural chemicals	863
	24. Foodstuffs; poisonous plants	865
	25. Motor vehicle exhaust gas	868.2
	26. Other/unspecified substance	860.2 - 860.9, 861, 864, 866 - 867, 868.0 - 868.1, 868.3 - 868.9, 869

**Appendix Table A1 (cont.) Cause Groups (E-Code Categories)**

Cause of Injury (Grouped)	Cause of Injury (value and label)	ICD 9 E-codes
<b>Falls</b>	27. Stairs 28. Ladder/scaffold 29. Building/structure 30. Different level: playground equipment 31. Different level: other 32. Same level: slip, trip, stumble 33. Same level: collision in sport 34. Fracture - cause unspecified 35. Other/unspecified fall	880 881 882 884.0 884.1 - 884.2, 884.9 885 886.0 887 883, 886.9, 888, 884.3 - 884.8
<b>Fire/Flames/Heat (Burns)</b>	36. Housefires 37. Clothing ignition 38. Hot substance or object, steam 39. Other/unspecified thermal	890 893 924.0, 924.8, 924.9 891 - 892, 894 - 899
<b>Hit/Struck/Crush</b>	48. Struck by falling object 50. Strike/struck by object or person: in sports 51. Strike/struck by object or person: other 52. Caught in or between objects	916 917.0 917.1 - 917.9 918
<b>Cutting/Piercing</b>	54. Cutting/piercing	920
<b>Asphyxia</b>	44. Aspiration, food 45. Aspiration, non-food 46. Mechanical suffocation	911 912 913

**Appendix Table A1(cont.) Cause Groups (E-Code Categories)**

Cause of Injury (Grouped)	Cause of Injury (value and label)	ICD 9 E-codes
<b>Other non-intentional</b>	40. Firearm missile 41. Excessive heat 42. Excessive cold 43. Exposure/ neglect/hunger/thirst 47. Foreign body 49. Dog bite 53. Machinery 55. Explosion 56. Electric current 57. Other non-intentional (incl. unspecified, late effects)	922 900 901 904 914 - 915 906.0 919 921, 923 925 902 - 903, 905, 906.1 - 906.9, 907 - 909, 924.1, 926 - 929
<b>Suicide</b>	58. Motor vehicle exhaust - SUICIDE 59. Hanging - SUICIDE 60. Firearm - SUICIDE 61. Poison, solids/liquids - SUICIDE 62. Cutting/piercing - SUICIDE 63. Other /unspecified - SUICIDE	952.0 953.0 955.0 - 955.4 950 956 951, 952.1 - 952.9, 953.1 - 953.9, 954, 955.5 - 955.9, 957 - 959
<b>Interpersonal Violence</b>	64. Unarmed fight/brawl IPV 65. Firearm IPV 66. Cutting/stabbing IPV 67. Child battering/maltreatment IPV 68. Other/unspecified IPV	960.0 965.0 - 965.4 966 967 960.1 - 960.9, 961 - 964, 965.5 - 965.9, 968 - 978, 990 - 999
<b>Undetermined Intent</b>	69. Undetermined intent	980 - 989

NOTE : Medical Misadventure (including post-operative complications & adverse effects of prescribed drugs - E870 - 879, 930 - 949) is not included in this study.





## **APPENDIX B**

### **NATURE OF INJURY & BODY PART INJURED (HOSPITALISATIONS)**



**Appendix Table B1 : Body region injured by cause of injury (Hospitalisations, Victoria 1993/94).**

BODY PART INJURED	CAUSE OF INJURY													Total
	MVA	Other transport	Near drown- ing	Poison- ing	Falls	Fire/ flames/ burns	Hit/ struck/ crush	Cut/ pierce	Asphyxia	Other	Self- inflicted	IPV	Intent not known	
<b>Total</b>	<b>6,120</b>	<b>3,089</b>	<b>74</b>	<b>2,761</b>	<b>23,161</b>	<b>926</b>	<b>6,412</b>	<b>3,740</b>	<b>225</b>	<b>13,776</b>	<b>3,891</b>	<b>2,859</b>	<b>368</b>	<b>67,402</b>
Head	1,236	571	3	7	1,992	104	867	45	0	337	18	655	8	<b>5,843</b>
Eyes	47	15	0	2	60	12	246	136	0	188	5	105	3	<b>819</b>
Face (excl. eyes)	636	241	1	9	1,498	17	780	189	25	689	13	1,037	7	<b>5,142</b>
Neck	193	32	0	4	139	19	42	9	118	769	34	22	2	<b>1,383</b>
Chest	531	88	0	0	579	42	89	17	39	154	13	118	2	<b>1,672</b>
Abdomen/Pelvis	677	245	1	5	1,155	18	239	42	8	335	54	165	5	<b>2,949</b>
Spine/back	155	78	1	0	509	38	31	15	0	117	3	21	1	<b>969</b>
Upper Extremity	1,023	1,028	0	11	7,011	197	1,857	2,358	0	2,954	213	351	34	<b>17,037</b>
Lower Extremity	1,266	652	6	11	7,510	203	1,902	706	0	3,021	25	110	9	<b>15,421</b>
Multiple Injuries	37	9	0	0	24	73	5	2	0	25	3	13	1	<b>192</b>
Other/unspecified	319	130	62	2,712	2,684	203	354	221	35	5,187	3,510	262	296	<b>15,975</b>

**Appendix Table B2 : Nature of injury by cause (Hospitalisations, Victoria, 1993/94).**

NATURE OF INJURY	CAUSE OF INJURY													Total
	MVA	Other transport	Near drowning	Poisoning	Falls	Fire/flames/burns	Hit/struck/crush	Cut/pierce	Asphyxia	Other	Self-inflicted	IPV	Intent not known	
<b>Total</b>	<b>6,120</b>	<b>3,089</b>	<b>74</b>	<b>2,761</b>	<b>23,161</b>	<b>926</b>	<b>6,412</b>	<b>3740</b>	<b>225</b>	<b>13,776</b>	<b>3,891</b>	<b>2,859</b>	<b>368</b>	<b>67,402</b>
Fractures	2,539	1,518	3	15	14,238	2	2,117	136	1	1,540	47	1,019	12	<b>23,187</b>
Dislocations	152	98	1	0	685	0	588	5	0	1,270	0	24	2	<b>2,825</b>
Sprains/strains	224	81	3	3	757	1	958	16	0	1,712	1	11	3	<b>3,770</b>
Intracranial (not fracture)	963	497	3	3	1,534	2	758	5	0	115	9	469	3	<b>4,361</b>
Internal injury (chest/abdomen)	246	93	0	1	118	0	122	11	0	61	24	102	3	<b>781</b>
Open wound	502	208	1	5	1,032	0	312	806	0	687	60	469	14	<b>4,096</b>
Superficial injury (incl. foreign body)	88	39	0	1	105	1	38	201	0	198	5	22	1	<b>699</b>
Bruising	536	223	1	6	894	0	851	1740	0	1,339	173	353	23	<b>6,139</b>
Burns	187	111	0	12	359	791	177	551	0	515	20	33	5	<b>2,761</b>
Poisoning	2	2	0	2,224	6	29	0	2	1	6	3,177	10	154	<b>5,613</b>
Near drowning	0	0	53	23	0	1	0	0	0	0	2	0	07	<b>56</b>
Asphyxia	0	0	0	0	0	0	1	0	48	17	15	3	2	<b>86</b>
Other/unspecified injuries	681	219	9	491	3,433	99	490	267	175	6,316	358	344	146	<b>13,028</b>

**Appendix Table B3 : Nature of injury by body region injured (Hospitalisations, Victoria, 1993/94).**

NATURE OF INJURY	LOCATION OF INJURY											
	Head	Eyes	Face (excl. eyes)	Neck	Chest	Abdomen/ pelvis	Spine/ back	Upper Extremity	Lower Extremity	Multiple injuries	Other/ unspecified	Total
<b>Total</b>	<b>5,843</b>	<b>819</b>	<b>5,142</b>	<b>1,383</b>	<b>1,672</b>	<b>2,949</b>	<b>969</b>	<b>17,037</b>	<b>15,421</b>	<b>192</b>	<b>15,975</b>	<b>67,402</b>
Fractures	468		2,421	152	1,151	750	717	9,231	8,283	9	5	<b>23,187</b>
Dislocations			14	26	8	13	28	861	1,871	4		<b>2,825</b>
Sprains/strains				387	13	2	68	811	2,458		31	<b>3,770</b>
Intracranial (not fracture)	4,361											<b>4,361</b>
Internal injury (chest/abdomen)					296	469				16		<b>781</b>
Open wound	767	350	1,855	78	55	189	112	640	26	12	12	<b>4,096</b>
Superficial injury (incl. foreign body)		37	121			58		189	237		57	<b>699</b>
Bruising		330	385	1		630		4,752	39	2		<b>6,139</b>
Burns	127	37	36	29	48	24	44	288	1,950	96	82	<b>2,761</b>
Poisoning											5,613	<b>5,613</b>
Near drowning											56	<b>56</b>
Asphyxia				86								<b>86</b>
Other/unspecified injuries	120	65	310	624	101	814		265	557	53	10,119	<b>13,028</b>



## **APPENDIX C**

### **INCIDENCE : DETAILED TABLES**





**Appendix Table C1 Estimated resident population, Victoria, June 30, 1993.**

Age group	Total	<i>Percent of total</i>	Males	Females
Total	4,462,066	<i>100.00%</i>	2,210,263	2,251,801
0-4	321,130	<i>7.20%</i>	164,712	156,418
5-14	621,280	<i>13.92%</i>	318,334	302,946
15-24	699,776	<i>15.68%</i>	356,199	343,577
25-44	1,390,561	<i>31.16%</i>	691,968	698,593
45-64	896,091	<i>20.08%</i>	451,567	444,524
65-74	318,807	<i>7.15%</i>	147,824	170,983
75 +	214,421	<i>4.81%</i>	79,659	134,762

Source : Australian Bureau of Statistics, 1993

**Appendix Table C2 Fatalities: incidence of injury cause by age group and gender. (excludes 142 deaths in later years from injuries sustained in 1993/94)**

	Motor vehicle traffic	Other transport	Drowning	Poisoning	Falls	Fire/flames/burns	Hit/struck/crush	Cutting/piercing	Asphyxia	Other	UNINTENTIONAL	Suicide	IPV	Unknown intent	INTENTIONAL	TOTAL	Injury death rate/100,000 population
<b>Total</b>	<b>441</b>	<b>41</b>	<b>39</b>	<b>77</b>	<b>189</b>	<b>30</b>	<b>14</b>	<b>3</b>	<b>20</b>	<b>38</b>	<b>892</b>	<b>527</b>	<b>57</b>	<b>11</b>	<b>595</b>	<b>1487</b>	<b>33.33</b>
<b>Death rate</b>	9.88	0.92	0.87	1.73	4.24	0.67	0.31	0.07	0.45	0.85	<b>19.99</b>	11.81	1.28	0.25	<b>13.33</b>	<b>33.33</b>	
<b>Age</b>																	
0-4	6	4	12	0	0	1	1	0	1	0	25	0	1	0	1	26	8.10
5-14	13	1	3	0	1	0	0	0	4	1	23	3	2	0	5	28	4.51
15-24	134	5	2	8	2	4	1	1	1	4	162	117	12	1	130	292	41.73
25-44	125	12	12	39	10	3	6	2	3	6	218	200	19	6	225	443	31.86
45-64	77	12	3	20	21	7	5	0	4	13	162	138	16	4	158	320	35.71
65-74	35	3	6	9	8	3	1	0	4	10	79	46	6	0	52	131	41.09
75+	51	4	1	1	147	12	0	0	3	4	223	23	1	0	24	247	115.19
<b>Male</b>	<b>323</b>	<b>35</b>	<b>28</b>	<b>50</b>	<b>99</b>	<b>18</b>	<b>14</b>	<b>3</b>	<b>14</b>	<b>33</b>	<b>617</b>	<b>416</b>	<b>37</b>	<b>8</b>	<b>461</b>	<b>1078</b>	<b>48.77</b>
<b>Death rate</b>	14.61	1.58	1.27	2.26	4.48	0.81	0.63	0.14	0.63	1.49	<b>27.92</b>	18.82	1.67	0.36	<b>20.86</b>	<b>48.77</b>	
<b>Age</b>																	
0-4	5	2	5	0	0	0	1	0	1	0	14	0	1	0	1	15	9.11
5-14	8	1	3	0	1	0	0	0	1	1	15	2	2	0	4	19	5.97
15-24	108	4	1	5	0	4	1	1	1	4	129	101	7	0	108	237	66.54
25-44	99	11	11	25	10	1	6	2	3	6	174	150	15	4	169	343	49.57
45-64	52	11	3	12	20	5	5	0	4	12	124	112	9	4	125	249	55.14
65-74	17	3	4	8	6	2	1	0	3	6	50	34	2	0	36	86	58.18
75+	34	3	1	0	62	6	0	0	1	4	111	17	1	0	18	129	161.94
<b>Female</b>	<b>118</b>	<b>6</b>	<b>11</b>	<b>27</b>	<b>90</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>5</b>	<b>275</b>	<b>111</b>	<b>20</b>	<b>3</b>	<b>134</b>	<b>409</b>	<b>18.16</b>
<b>Death rate</b>	5.24	0.27	0.49	1.20	4.00	0.53	0.00	0.00	0.27	0.22	<b>12.21</b>	<b>4.93</b>	<b>0.89</b>	<b>0.13</b>	<b>5.95</b>	<b>18.16</b>	
<b>Age</b>																	
0-4	1	2	7	0	0	1	0	0	0	0	11	0	0	0	0	11	7.03
5-14	5	0	0	0	0	0	0	0	3	0	8	1	0	0	1	9	2.97
15-24	26	1	1	3	2	0	0	0	0	0	33	16	5	1	22	55	16.01
25-44	26	1	1	14	0	2	0	0	0	0	44	50	4	2	56	100	14.31
45-64	25	1	0	8	1	2	0	0	0	1	38	26	7	0	33	71	15.97
65-74	18	0	2	1	2	1	0	0	1	4	29	12	4	0	16	45	26.32
75+	17	1	0	1	85	6	0	0	2	0	112	6	0	0	6	118	87.56

Sources : Coroner's Facilitation System. NISU/ABS (Doctor certified deaths)  
 Unnatural deaths. Collated from the findings of the State Coroner. 1993/94.  
 State Coroner's Office, Victoria, Australia. Table CRN 4.5, p. 253.  
 (All recorded deaths to 30/6/94 from injuries sustained in 1993/94)

**Appendix Table C3 Hospital admissions: incidence of injury cause by age group and gender.**

	Motor vehicle traffic	Other transport	Drown- ing	Poison- ing	Falls	Fire/ flames/ burns	Hit/ struck/ crush	Cutting/ piercing	Asphyxia	Other	UNINTENT -IONAL	Suicide	IPV	Unknown intent	INTENT- IONAL	TOTAL	Injury hospitalisation rate/100,000 population
<b>Total</b>	<b>6,120</b>	<b>3,089</b>	<b>74</b>	<b>2,761</b>	<b>23,161</b>	<b>926</b>	<b>6,412</b>	<b>3,740</b>	<b>225</b>	<b>13,776</b>	<b>60,284</b>	<b>3,891</b>	<b>2,859</b>	<b>368</b>	<b>7,118</b>	<b>67,402</b>	<b>1,511</b>
<i>Hosp. rate</i>	<i>137</i>	<i>69</i>	<i>2</i>	<i>62</i>	<i>519</i>	<i>21</i>	<i>144</i>	<i>84</i>	<i>5</i>	<i>309</i>	<i>1,351</i>	<i>87</i>	<i>64</i>	<i>8</i>	<i>160</i>	<i>1,511</i>	
<b>Age 0-4</b>	105	109	32	796	1,302	261	435	324	89	723	4,176	2	69	9	80	4,256	1,325
<b>5-14</b>	419	975	7	97	3,607	72	939	457	19	1,028	7,620	68	89	9	166	7,786	1,253
<b>15-24</b>	2,013	789	10	548	1,852	120	2,140	911	10	2,633	11,026	1,136	1,089	101	2,326	13,352	1,908
<b>25-44</b>	1,979	745	20	807	2,720	205	2,056	1,231	27	4,905	14,695	2,015	1,254	170	3,439	18,134	1,304
<b>45-64</b>	902	328	2	270	3,070	133	515	561	41	2,786	8,608	515	285	49	849	9,457	1,055
<b>65-74</b>	369	77	2	104	2,832	65	154	148	18	872	4,641	95	42	19	156	4,797	1,505
<b>75+</b>	332	66	1	137	7,775	70	173	108	21	829	9,512	60	30	11	101	9,613	4,483
<b>Missing</b>	1	0	0	2	3	0	0	0	0	0	6	0	1	0	1	7	
<b>Male</b>	<b>3,750</b>	<b>1,966</b>	<b>50</b>	<b>1,391</b>	<b>10,177</b>	<b>606</b>	<b>4,969</b>	<b>2,779</b>	<b>120</b>	<b>8,971</b>	<b>34,779</b>	<b>1,569</b>	<b>2,280</b>	<b>211</b>	<b>4,060</b>	<b>38,839</b>	<b>1,757</b>
<i>Hosp. rate</i>	<i>170</i>	<i>89</i>	<i>2</i>	<i>63</i>	<i>460</i>	<i>27</i>	<i>225</i>	<i>126</i>	<i>5</i>	<i>406</i>	<i>1,574</i>	<i>71</i>	<i>103</i>	<i>10</i>	<i>184</i>	<i>1,757</i>	
<b>Age 0-4</b>	63	72	19	471	733	167	260	212	49	425	2,471	1	32	5	38	2,509	1,523
<b>5-14</b>	277	567	4	44	2,294	53	691	317	15	647	4,909	11	62	3	76	4,985	1,566
<b>15-24</b>	1,329	533	10	236	1,398	95	1,839	753	5	1,908	8,106	423	937	62	1,422	9,528	2,675
<b>25-44</b>	1,296	490	14	408	1,723	150	1,667	945	13	3,527	10,233	856	983	99	1,938	12,171	1,759
<b>45-64</b>	465	231	2	142	1,481	76	388	422	18	1,794	5,019	226	226	29	481	5,500	1,218
<b>65-74</b>	185	49	1	44	887	33	78	92	12	421	1,802	33	29	9	71	1,873	1,267
<b>75+</b>	135	24	0	46	1,658	32	46	38	8	249	2,236	19	10	4	33	2,269	2,848
<b>Missing</b>	0	0	0	0	3	0	0	0	0	0	3	0	1	0	1	4	
<b>Female</b>	<b>2,370</b>	<b>1,123</b>	<b>24</b>	<b>1,370</b>	<b>12,984</b>	<b>320</b>	<b>1,443</b>	<b>961</b>	<b>105</b>	<b>4,805</b>	<b>25,505</b>	<b>2,322</b>	<b>579</b>	<b>157</b>	<b>3,058</b>	<b>28,563</b>	<b>1,268</b>
<i>Hosp. rate</i>	<i>105</i>	<i>50</i>	<i>1</i>	<i>61</i>	<i>577</i>	<i>14</i>	<i>64</i>	<i>43</i>	<i>5</i>	<i>213</i>	<i>1,133</i>	<i>103</i>	<i>26</i>	<i>7</i>	<i>136</i>	<i>1,268</i>	
<b>Age 0-4</b>	42	37	13	325	569	94	175	112	40	298	1,705	1	37	4	42	1,747	1,117
<b>5-14</b>	142	408	3	53	1,313	19	248	140	4	381	2,711	57	27	6	90	2,801	925
<b>15-24</b>	684	256	0	312	454	25	301	158	5	725	2,920	713	152	39	904	3,824	1,113
<b>25-44</b>	683	255	6	399	997	55	389	286	14	1,378	4,462	1,159	271	71	1,501	5,963	854
<b>45-64</b>	437	97	0	128	1,589	57	127	139	23	992	3,589	289	59	20	368	3,957	890
<b>65-74</b>	184	28	1	60	1,945	32	76	56	6	451	2,839	62	13	10	85	2,924	1,710
<b>75+</b>	197	42	1	91	6,117	38	127	70	13	580	7,276	41	20	7	68	7,344	5,450
<b>Missing</b>	1	0	0	2	0	0	0	0	0	0	3	0	0	0	0	3	

Source : Victorian Inpatient Minimum Dataset (VIMD) - HOSPITAL ADMISSIONS - VICTORIA (from injuries incurred in 1993/94)  
(excludes medical misadventure, adverse effects, etc.: selected from ADSOURCE only = C,L,P,Z,4,A,N; excludes re-admissions within 30 days & deaths.)  
(Data extraction by V. Stathakis, MUARC)

**Appendix Table C4 Non-hospitalised injury cases: estimated incidence of injury cause by age group and gender.**

	Motor vehicle traffic	Other transport	Drown- ing	Poison- ing	Falls	Fire/ flames/ burns	Hit/ struck/ crush	Cutting/ piercing	Asphyxia	Other	UNINTENT- IONAL	Self- harm	IPV	Unknown intent	INTENT- IONAL	TOTAL	Non- hospitalised injury rate/100,000 population
<b>Total</b>	<b>26,584</b>	<b>14,645</b>	<b>202</b>	<b>7,717</b>	<b>105,203</b>	<b>9,403</b>	<b>81,044</b>	<b>43,581</b>	<b>447</b>	<b>85,640</b>	<b>374,467</b>	<b>3,877</b>	<b>17,961</b>	<b>856</b>	<b>22,693</b>	<b>397,160</b>	<b>8,901</b>
<i>Rate</i>	<i>596</i>	<i>328</i>	<i>5</i>	<i>173</i>	<i>2,358</i>	<i>211</i>	<i>1,816</i>	<i>977</i>	<i>10</i>	<i>1,919</i>	<i>8,392</i>	<i>87</i>	<i>403</i>	<i>19</i>	<i>509</i>	<i>8,901</i>	
<b>Age 0-4</b>	648	934	94	3,758	14,950	1,736	5,864	2,821	82	7,817	38,706	50	349	64	463	39,169	12,197
<b>5-14</b>	3,850	4,431	17	533	31,478	1,062	19,860	5,161	56	12,070	78,520	164	1,441	119	1,723	80,243	12,916
<b>15-24</b>	8,777	3,945	24	1,140	17,235	2,300	20,216	9,582	78	17,818	81,116	1,398	7,196	350	8,944	90,060	12,870
<b>25-44</b>	8,666	3,458	31	1,574	18,044	2,618	24,606	16,166	134	31,407	106,705	1,914	7,110	237	9,261	115,966	8,340
<b>45-64</b>	3,067	1,244	35	432	11,038	1,089	6,967	6,638	68	12,571	43,150	311	1,490	55	1,856	45,006	5,022
<b>65-74</b>	865	309	0	153	5,403	256	1,774	1,928	16	2,097	12,802	17	201	10	228	13,030	4,087
<b>75+</b>	618	261	0	92	6,540	292	1,416	996	7	1,649	11,873	12	95	13	120	11,993	5,593
<b>Unknown</b>	93	62	0	34	514	47	339	288	7	210	1,595	10	79	8	97	1,692	
<b>Males</b>	<b>15,053</b>	<b>8,780</b>	<b>178</b>	<b>4,311</b>	<b>54,555</b>	<b>5,358</b>	<b>56,660</b>	<b>29,011</b>	<b>248</b>	<b>56,799</b>	<b>230,952</b>	<b>1,868</b>	<b>13,426</b>	<b>578</b>	<b>15,872</b>	<b>246,825</b>	<b>11,167</b>
<i>Rate</i>	<i>681</i>	<i>397</i>	<i>8</i>	<i>195</i>	<i>2,468</i>	<i>242</i>	<i>2,563</i>	<i>1,313</i>	<i>11</i>	<i>2,570</i>	<i>10,449</i>	<i>85</i>	<i>607</i>	<i>26</i>	<i>718</i>	<i>11,167</i>	
<b>Age 0-4</b>	337	567	87	2,033	8,483	942	3,434	1,761	43	4,084	21,772	42	167	35	243	22,015	13,366
<b>5-14</b>	2,392	2,831	10	300	16,547	554	13,305	3,225	20	6,919	46,104	114	1,041	90	1,246	47,349	14,874
<b>15-24</b>	5,147	2,579	21	657	10,858	1,347	15,612	7,050	58	12,484	55,814	660	5,616	244	6,519	62,333	17,500
<b>25-44</b>	5,032	1,884	24	978	10,123	1,722	18,154	11,173	107	22,929	72,127	908	5,353	162	6,423	78,550	11,352
<b>45-64</b>	1,444	658	35	185	4,827	506	4,511	4,143	16	8,560	24,885	121	1,027	37	1,184	26,069	5,773
<b>65-74</b>	336	147	0	107	1,712	73	939	1,124	3	1,004	5,447	9	169	6	183	5,630	3,808
<b>75+</b>	300	63	0	38	1,771	172	483	311	0	682	3,820	7	11	2	19	3,839	4,819
<b>Unknown</b>	65	51	0	13	235	41	222	223	0	136	986	9	42	3	54	1,039	
<b>Females</b>	<b>11,531</b>	<b>5,865</b>	<b>24</b>	<b>3,407</b>	<b>50,648</b>	<b>4,045</b>	<b>24,384</b>	<b>14,571</b>	<b>199</b>	<b>28,840</b>	<b>143,514</b>	<b>2,009</b>	<b>4,534</b>	<b>278</b>	<b>6,821</b>	<b>150,335</b>	<b>6,676</b>
<i>Rate</i>	<i>512</i>	<i>260</i>	<i>1</i>	<i>151</i>	<i>2,249</i>	<i>180</i>	<i>1,083</i>	<i>647</i>	<i>9</i>	<i>1,281</i>	<i>6,373</i>	<i>89</i>	<i>201</i>	<i>12</i>	<i>303</i>	<i>6,676</i>	
<b>Age 0-4</b>	311	367	7	1,725	6,467	794	2,430	1,060	39	3,733	16,934	9	182	29	220	17,154	10,967
<b>5-14</b>	1,458	1,600	7	233	14,931	508	6,556	1,936	36	5,151	32,416	49	399	29	478	32,894	10,858
<b>15-24</b>	3,630	1,366	3	483	6,377	953	4,605	2,532	20	5,334	25,302	738	1,581	106	2,425	27,727	8,070
<b>25-44</b>	3,634	1,573	7	596	7,922	897	6,452	4,993	26	8,477	34,578	1,007	1,756	75	2,838	37,417	5,356
<b>45-64</b>	1,623	586	0	248	6,212	583	2,457	2,495	51	4,011	18,265	191	463	18	671	18,937	4,260
<b>65-74</b>	528	162	0	46	3,691	184	834	804	13	1,093	7,355	9	32	5	45	7,400	4,328
<b>75+</b>	318	199	0	55	4,769	120	933	686	7	968	8,053	5	85	11	101	8,154	6,051
<b>Unknown</b>	29	11	0	21	279	6	117	65	7	74	609	2	37	5	43	653	

Source : VIMD, VEMD, ELVIS -Victoria 1993/94

(excludes medical misadventure, adverse effects, etc.) (Data extraction by Voula Stathakis & Mark Sinclair-Stokes, MUARC)

**Appendix Table C5 Motor vehicle traffic - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>33,145</b>	<b>743</b>	<b>441</b>	<b>9.88</b>	<b>6,120</b>	<b>137</b>	<b>26,584</b>	<b>596</b>
0-4	759	236	6	1.87	105	33	648	202
5-14	4282	689	13	2.09	419	67	3,850	620
15-24	10924	1561	134	19.15	2,013	287	8,777	1254
25-44	10770	775	125	8.99	1,979	142	8,666	623
45-64	4046	452	77	8.59	902	101	3,067	342
65-74	1269	398	35	10.98	369	116	865	271
75+	1001	467	51	23.78	332	155	618	288
Missing	94				1		93	
<b>Male</b>	<b>19,126</b>	<b>865</b>	<b>323</b>	<b>14.61</b>	<b>3,750</b>	<b>170</b>	<b>15,053</b>	<b>681</b>
0-4	405	246	5	3.04	63	38	337	205
5-14	2,677	841	8	2.51	277	87	2,392	751
15-24	6584	1848	108	30.32	1,329	373	5,147	1445
25-44	6427	989	99	14.31	1,296	93	5,032	362
45-64	1961	434	52	11.52	465	103	1,444	320
65-74	538	364	17	11.50	185	125	336	227
75+	469	589	34	42.68	135	169	300	377
Missing	65				0		65	
<b>Female</b>	<b>14,019</b>	<b>623</b>	<b>118</b>	<b>5.24</b>	<b>2,370</b>	<b>105</b>	<b>11,531</b>	<b>512</b>
0-4	354	226	1	0.64	42	27	311	199
5-14	1,605	530	5	1.65	142	47	1,458	481
15-24	4340	1263	26	7.57	684	199	3,630	1057
25-44	4343	622	26	3.72	683	98	3,634	520
45-64	2085	469	25	5.62	437	98	1,623	365
65-74	730	427	18	10.53	184	108	528	309
75+	532	311	17		197	146	318	236
Missing	30				1		29	

\* Excludes an estimated 62 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C6 Other transport - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>17,775</b>	<b>398</b>	<b>41</b>	<b>0.92</b>	<b>3,089</b>	<b>69</b>	<b>14,645</b>	<b>328</b>
0-4	1,047	326	4	1.25	109	34	934	291
5-14	5,407	870	1	0.16	975	157	4,431	713
15-24	4,739	677	5	0.71	789	113	3,945	564
25-44	4,215	303	12	0.86	745	54	3,458	249
45-64	1,584	177	12	1.34	328	37	1,244	139
65-74	389	122	3	0.94	77	24	309	97
75+	331	154	4	1.87	66	31	261	122
Missing	62				0		62	
<b>Male</b>	<b>10,781</b>	<b>488</b>	<b>35</b>	<b>1.58</b>	<b>1,966</b>	<b>89</b>	<b>8,780</b>	<b>397</b>
0-4	641	389	2	1.21	72	44	567	344
5-14	3,399	1068	1	0.31	567	178	2,831	889
15-24	3,116	875	4	1.12	533	150	2,579	724
25-44	2,385	345	11	1.59	490	71	1,884	272
45-64	900	199	11	2.44	231	51	658	146
65-74	199	135	3	2.03	49	33	147	99
75+	90	113	3	3.77	24	30	63	79
Missing	51				0		51	
<b>Female</b>	<b>6,994</b>	<b>311</b>	<b>6</b>	<b>0.27</b>	<b>1,123</b>	<b>50</b>	<b>5,865</b>	<b>260</b>
0-4	406	260	2	1.28	37	24	367	235
5-14	2,008	663	0	0.00	408	135	1,600	528
15-24	1,623	472	1	0.29	256	75	1,366	398
25-44	1,829	262	1	0.14	255	37	1,573	225
45-64	684	154	1	0.22	97	22	586	132
65-74	190	111	0	0.00	28	16	162	95
75+	242	180	1	0.74	42	31	199	148
Missing	11				0		11	

\* Excludes an estimated 3 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C7 Drowning - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>315</b>	<b>7</b>	<b>39</b>	<b>0.87</b>	<b>74</b>	<b>2</b>	<b>202</b>	<b>5</b>
0-4	138	43	12	3.74	32	10	94	29
5-14	27	4	3	0.48	7	1	17	3
15-24	36	5	2	0.29	10	1	24	3
25-44	63	5	12	0.86	20	1	31	2
45-64	40	4	3	0.33	2	0.2	35	4
65-74	8	3	6	1.88	2	0.6	0	0
75+	2	1	1	0.47	1	0.5	0	0
Missing	0				0		0	
<b>Male</b>	<b>256</b>	<b>12</b>	<b>28</b>	<b>1.27</b>	<b>50</b>	<b>2</b>	<b>178</b>	<b>8</b>
0-4	111	67	5	3.04	19	12	87	53
5-14	17	5	3	0.94	4	1	10	3
15-24	32	9	1	0.28	10	3	21	6
25-44	49	7	11	1.59	14	2	24	3
45-64	40	9	3	0.66	2	0.4	35	8
65-74	5	3	4	2.71	1	0.7	0	0
75+	1	1	1	1.26	0	0	0	0
Missing	0				0		0	
<b>Female</b>	<b>59</b>	<b>3</b>	<b>11</b>	<b>0.49</b>	<b>24</b>	<b>1</b>	<b>24</b>	<b>1</b>
0-4	27	17	7	4.48	13	8	7	4
5-14	10	3	0	0.00	3	1	7	2
15-24	4	1	1	0.29	0	0	3	1
25-44	14	2	1	0.14	6	1	7	1
45-64	0	0	0	0.00	0	0	0	0
65-74	3	2	2	1.17	1	1	0	0
75+	1	1	0	0.00	1	1	0	0
Missing	0				0		0	

\* Excludes an estimated 1 death occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C8 Poisoning - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>10,555</b>	<b>237</b>	<b>77</b>	<b>1.73</b>	<b>2,761</b>	<b>62</b>	<b>7,717</b>	<b>173</b>
0-4	4,554	1418	0	0.00	796	248	3,758	1170
5-14	630	101	0	0.00	97	16	533	86
15-24	1,696	242	8	1.14	548	78	1,140	163
25-44	2420	174	39	2.80	807	58	1,574	113
45-64	722	81	20	2.23	270	30	432	48
65-74	266	83	9	2.82	104	33	153	48
75+	230	107	1	0.47	137	64	92	43
Missing	36				2		34	
<b>Male</b>	<b>5,752</b>	<b>260</b>	<b>50</b>	<b>2.26</b>	<b>1,391</b>	<b>63</b>	<b>4,311</b>	<b>195</b>
0-4	2,504	1520	0	0.00	471	286	2,033	1234
5-14	344	108	0	0.00	44	14	300	94
15-24	898	252	5	1.40	236	66	657	184
25-44	1411	204	25	3.61	408	59	978	141
45-64	339	75	12	2.66	142	31	185	41
65-74	159	108	8	5.41	44	30	107	72
75+	84	105	0	0.00	46	58	38	48
Missing	13				0		13	
<b>Female</b>	<b>4,804</b>	<b>213</b>	<b>27</b>	<b>1.20</b>	<b>1,370</b>	<b>61</b>	<b>3,407</b>	<b>151</b>
0-4	2,050	1311	0	0.00	325	208	1,725	1103
5-14	286	94	0	0.00	53	17	233	77
15-24	798	232	3	0.87	312	91	483	141
25-44	1009	144	14	2.00	399	57	596	85
45-64	384	86	8	1.80	128	29	248	56
65-74	107	63	1	0.58	60	35	46	27
75+	147	109	1	0.74	91	68	55	41
Missing	23				2		21	



**Appendix Table C9 Falls - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>128,553</b>	<b>2,881</b>	<b>189</b>	<b>4.24</b>	<b>23,161</b>	<b>519</b>	<b>105,203</b>	<b>2,358</b>
0-4	16,252	5061	0	0.00	1,302	405	14950	4655
5-14	35,086	5647	1	0.16	3,607	581	31478	5067
15-24	19,089	2728	2	0.29	1,852	265	17235	2463
25-44	20,774	1494	10	0.72	2,720	196	18044	1298
45-64	14,129	1577	21	2.34	3,070	343	11038	1232
65-74	8,243	2586	8	2.51	2,832	888	5403	1695
75+	14,462	6745	147	68.56	7,775	3626	6540	3050
Missing	517				3		514	
<b>Male</b>	<b>64,831</b>	<b>2,933</b>	<b>99</b>	<b>4.48</b>	<b>10,177</b>	<b>460</b>	<b>54,555</b>	<b>2,468</b>
0-4	9,216	5595	0	0.00	733	445	8,483	5150
5-14	18,842	5919	1	0.31	2,294	721	16,547	5198
15-24	12,256	3441	0	0.00	1,398	392	10,858	3048
25-44	11,856	1713	10	1.45	1,723	249	10,123	1463
45-64	6,328	1401	20	4.43	1,481	328	4,827	1069
65-74	2,605	1762	6	4.06	887	600	1,712	1158
75+	3,491	4382	62	77.83	1,658	2081	1,771	2223
Missing	238				3		235	
<b>Female</b>	<b>63,722</b>	<b>2,830</b>	<b>90</b>	<b>4.00</b>	<b>12,984</b>	<b>577</b>	<b>50,648</b>	<b>2,249</b>
0-4	7,036	4498	0	0.00	569	364	6,467	4134
5-14	16,244	5362	0	0.00	1,313	433	14,931	4929
15-24	6,833	1989	2	0.58	454	132	6,377	1856
25-44	8,919	1277	0	0.00	997	143	7,922	1134
45-64	7,802	1755	1	0.22	1,589	357	6,212	1397
65-74	5,638	3297	2	1.17	1,945	1138	3,691	2159
75+	10,971	8141	85	63.07	6,117	4539	4,769	3539
Missing	279				0		279	

\* Excludes an estimated 53 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C10 Fire/Flames/Burns - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>10,359</b>	<b>232</b>	<b>30</b>	<b>0.67</b>	<b>926</b>	<b>21</b>	<b>9,403</b>	<b>211</b>
0-4	1,998	622	1	0.31	261	81	1,736	541
5-14	1,134	183	0	0.00	72	12	1,062	171
15-24	2,424	346	4	0.57	120	17	2,300	329
25-44	2,826	203	3	0.22	205	15	2,618	188
45-64	1,229	137	7	0.78	133	15	1,089	122
65-74	324	102	3	0.94	65	20	256	80
75+	374	174	12	5.60	70	33	292	136
Missing	47				0		47	
<b>Male</b>	<b>5,982</b>	<b>271</b>	<b>18</b>	<b>0.81</b>	<b>606</b>	<b>27</b>	<b>5,358</b>	<b>242</b>
0-4	1,109	673	0	0.00	167	101	942	572
5-14	607	191	0	0.00	53	17	554	174
15-24	1,446	406	4	1.12	95	27	1,347	378
25-44	1,873	271	1	0.14	150	22	1,722	249
45-64	587	130	5	1.11	76	5	506	112
65-74	108	73	2	1.35	33	22	73	49
75+	210	264	6	7.53	32	40	172	216
Missing	41				0		41	
<b>Female</b>	<b>4,377</b>	<b>194</b>	<b>12</b>	<b>0.53</b>	<b>320</b>	<b>14</b>	<b>4,045</b>	<b>180</b>
0-4	889	568	1	0.64	94	60	794	508
5-14	527	174	0	0.00	19	6	508	168
15-24	978	285	0	0.00	25	7	953	277
25-44	954	137	2	0.29	55	8	897	128
45-64	642	144	2	0.45	57	13	583	131
65-74	217	127	1	0.58	32	19	184	108
75+	164	122	6	4.45	38	28	120	89
Missing	6				0		6	

**Appendix Table C11 Hit/Struck/Crush - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>87,470</b>	<b>1,960</b>	<b>14</b>	<b>0.31</b>	<b>6,412</b>	<b>144</b>	<b>81,044</b>	<b>1,816</b>
0-4	6,300	1962	1	0.31	435	135	5,864	1826
5-14	20,799	3,348	0	0.00	939	151	19,860	3197
15-24	22,357	3195	1	0.14	2,140	306	20,216	2889
25-44	26668	1918	6	0.43	2,056	148	24,606	1770
45-64	7487	836	5	0.56	515	57	6,967	777
65-74	1,929	605	1	0.31	154	48	1,774	556
75+	1,589	741	0	0.00	173	81	1,416	660
Missing	339				0		339	
<b>Male</b>	<b>61,643</b>	<b>2,789</b>	<b>14</b>	<b>0.63</b>	<b>4,969</b>	<b>225</b>	<b>56,660</b>	<b>2,563</b>
0-4	3,695	2243	1	0.61	260	158	3,434	2085
5-14	13,996	4397	0	0.00	691	217	13,305	4180
15-24	17,452	4900	1	0.28	1,839	516	15,612	4383
25-44	19827	2865	6	0.87	1,667	241	18,154	2624
45-64	4,904	1086	5	1.11	388	86	4,511	999
65-74	1,018	689	1	0.68	78	53	939	635
75+	529	664	0	0.00	46	58	483	606
Missing	222				0		222	
<b>Female</b>	<b>25,,827</b>	<b>1,147</b>	<b>0</b>	<b>0.00</b>	<b>1,443</b>	<b>64</b>	<b>24,384</b>	<b>1,083</b>
0-4	2,605	1665	0	0.00	175	112	2,430	1554
5-14	6,804	2246	0	0.00	248	82	6,556	2164
15-24	4,906	1428	0	0.00	301	88	4,605	1340
25-44	6,841	979	0	0.00	389	56	6,452	924
45-64	2,584	581	0	0.00	127	29	2,457	553
65-74	910	532	0	0.00	76	44	834	488
75+	1,060	787	0	0.00	127	94	933	692
Missing	117		0	0.00	0		117	

\* Excludes an estimated 1 death occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C12 Cutting/Piercing - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>47,324</b>	<b>1,061</b>	<b>3</b>	<b>0.07</b>	<b>3,740</b>	<b>84</b>	<b>43,581</b>	<b>977</b>
0-4	3,145	979	0	0.00	324	101	2,821	878
5-14	5,618	904	0	0.00	457	74	5,161	831
15-24	10,494	1500	1	0.14	911	130	9,582	1369
25-44	17,399	1251	2	0.14	1,231	89	16,166	1163
45-64	7,199	803	0	0.00	561	63	6,638	741
65-74	2,076	651	0	0.00	148	46	1,928	605
75+	1,104	515	0	0.00	108	50	996	465
Missing	288				0		288	
<b>Male</b>	<b>31,793</b>	<b>1,438</b>	<b>3</b>	<b>0.14</b>	<b>2,779</b>	<b>126</b>	<b>29,011</b>	<b>1,313</b>
0-4	1,973	1198	0	0.00	212	129	1,761	1069
5-14	3,542	1113	0	0.00	317	100	3,225	1013
15-24	7,804	2191	1	0.28	753	211	7,050	1979
25-44	12,120	1752	2	0.29	945	137	11,173	1615
45-64	4,565	1011	0	0.00	422	93	4,143	917
65-74	1,216	823	0	0.00	92	62	1,124	760
75+	349	438	0	0.00	38	48	311	390
Missing	223				0		223	
<b>Female</b>	<b>15,532</b>	<b>690</b>	<b>0</b>	<b>0.00</b>	<b>961</b>	<b>43</b>	<b>14,571</b>	<b>647</b>
0-4	1,172	749	0	0.00	112	72	1,060	678
5-14	2,076	685	0	0.00	140	46	1,936	639
15-24	2,690	783	0	0.00	158	46	2,532	737
25-44	5,279	756	0	0.00	286	41	4,993	715
45-64	2,634	593	0	0.00	139	31	2,495	561
65-74	860	503	0	0.00	56	33	804	470
75+	756	561	0	0.00	70	52	686	509
Missing	65				0		65	

**Appendix Table C13 Asphyxia - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>692</b>	<b>16</b>	<b>20</b>	<b>0.45</b>	<b>225</b>	<b>5</b>	<b>447</b>	<b>10</b>
0-4	172	54	1	0.31	89	28	82	26
5-14	79	13	4	0.64	19	3	56	9
15-24	89	13	1	0.14	10	1	78	11
25-44	164	12	3	0.22	27	2	134	10
45-64	113	13	4	0.45	41	5	68	8
65-74	38	12	4	1.25	18	6	16	5
75+	31	14	3	1.40	21	10	7	3
Missing	7				0		7	
<b>Male</b>	<b>382</b>	<b>17</b>	<b>14</b>	<b>0.63</b>	<b>120</b>	<b>5</b>	<b>248</b>	<b>11</b>
0-4	93	56	1	0.61	49	30	43	26
5-14	36	11	1	0.31	15	5	20	6
15-24	64	18	1	0.28	5	1	58	16
25-44	123	18	3	0.43	13	2	107	15
45-64	38	8	4	0.89	18	4	16	4
65-74	18	12	3	2.03	12	8	3	2
75+	9	11	1	1.26	8	10	0	0
Missing	0				0		0	
<b>Female</b>	<b>310</b>	<b>14</b>	<b>6</b>	<b>0.27</b>	<b>105</b>	<b>5</b>	<b>199</b>	<b>9</b>
0-4	79	51	0	0.00	40	26	39	25
5-14	43	14	3	0.99	4	1	36	12
15-24	25	7	0	0.00	5	1	20	6
25-44	40	6	0	0.00	14	2	26	4
45-64	74	17	0	0.00	23	5	51	11
65-74	20	12	1	0.58	6	4	13	8
75+	22	16	2	1.48	13	10	7	5
Missing	7				0		7	

\* Excludes an estimated 1 death occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C14 Other - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>99,454</b>	<b>2,229</b>	<b>38</b>	<b>0.85</b>	<b>13,776</b>	<b>309</b>	<b>85,640</b>	<b>1,919</b>
0-4	8,540	2659	0	0.00	723	225	7,817	2434
5-14	13,099	2108	1	0.16	1,028	165	12,070	1943
15-24	20,455	2923	4	0.57	2,633	376	17,818	2546
25-44	36,318	2612	6	0.43	4,905	353	31,407	2259
45-64	15,370	1715	13	1.45	2,786	311	12,571	1403
65-74	2,979	934	10	3.14	872	274	2,097	658
75+	2,482	1158	4	1.87	829	387	1,649	769
Missing	210				0		210	
<b>Male</b>	<b>65,803</b>	<b>2,977</b>	<b>33</b>	<b>1.49</b>	<b>8,971</b>	<b>406</b>	<b>56,799</b>	<b>2,570</b>
0-4	4,509	2738	0	0.00	425	258	4,084	2479
5-14	7,567	2377	1	0.31	647	203	6,919	2174
15-24	14,396	4042	4	1.12	1,908	536	12,484	3505
25-44	26,462	3824	6	0.87	3,527	510	22,929	3314
45-64	10,366	2299	12	2.66	1,794	397	8,560	1896
65-74	1,431	968	6	4.06	421	285	1,004	679
75+	935	1174	4	5.02	249	313	682	480
Missing	136				0		136	
<b>Female</b>	<b>33,650</b>	<b>1,494</b>	<b>5</b>	<b>0.22</b>	<b>4,805</b>	<b>213</b>	<b>28,840</b>	<b>1,281</b>
0-4	4,031	2577	0	0.00	298	191	3,733	2387
5-14	5,532	1826	0	0.00	381	126	5,151	1700
15-24	6,059	1764	0	0.00	725	211	5,334	1552
25-44	9,855	1411	0	0.00	1,378	197	8,477	1213
45-64	5,004	1126	1	0.22	992	223	4,011	902
65-74	1,548	905	4	2.34	451	264	1,093	639
75+	1,548	1149	0	0.00	580	430	968	718
Missing	74				0		74	

\* Excludes an estimated 2 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C15 Suicide/Self harm - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>8,295</b>	<b>186</b>	<b>527</b>	<b>11.81</b>	<b>3,891</b>	<b>87</b>	<b>3,877</b>	<b>87</b>
0-4	52	16	0	0.00	2	0.6	50	16
5-14	235	38	3	0.48	68	11	164	26
15-24	2651	379	117	16.72	1,136	162	1,398	200
25-44	4129	297	200	14.38	2,015	145	1,914	138
45-64	964	108	138	15.40	515	57	311	35
65-74	158	50	46	14.43	95	30	17	5
75+	95	44	23	10.73	60	28	12	6
Missing	10				0		10	
<b>Male</b>	<b>3,853</b>	<b>174</b>	<b>416</b>	<b>18.82</b>	<b>1,569</b>	<b>71</b>	<b>1,868</b>	<b>85</b>
0-4	43	26	0	0.00	1	1	42	25
5-14	127	40	2	0.63	11	3	114	36
15-24	1184	332	101	28.35	423	119	660	185
25-44	1914	277	150	21.68	856	124	908	131
45-64	459	102	112	24.80	226	50	121	27
65-74	76	51	34	23.00	33	22	9	6
75+	43	54	17	21.34	19	24	7	9
Missing	9				0		9	
<b>Female</b>	<b>4,442</b>	<b>197</b>	<b>111</b>	<b>4.93</b>	<b>2,322</b>	<b>103</b>	<b>2,009</b>	<b>89</b>
0-4	10	6	0	0.00	1	1	9	6
5-14	107	35	1	0.33	57	19	49	16
15-24	1,467	427	16	4.66	713	212	738	215
25-44	2216	317	50	7.16	1,159	166	1,007	144
45-64	506	114	26	5.85	289	65	191	43
65-74	83	49	12	7.02	62	36	9	5
75+	52	39	6	4.45	41	30	5	4
Missing	2				0		2	

\* Excludes an estimated 17 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table C16 Interpersonal violence - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities*		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>20,877</b>	<b>468</b>	<b>57</b>	<b>1.28</b>	<b>2,859</b>	<b>64</b>	<b>17,961</b>	<b>403</b>
0-4	419	130	1	0.31	69	21	349	109
5-14	1,532	247	2	0.32	89	14	1,441	232
15-24	8297	1186	12	1.71	1,089	156	7,196	1028
25-44	8383	603	19	1.37	1,254	90	7,110	511
45-64	1791	200	16	1.79	285	32	1,490	166
65-74	249	78	6	1.88	42	13	201	63
75+	126	59	1	0.47	30	14	95	44
Missing	80				1		79	
<b>Male</b>	<b>15,743</b>	<b>712</b>	<b>37</b>	<b>1.67</b>	<b>2,280</b>	<b>103</b>	<b>13,426</b>	<b>607</b>
0-4	200	121	1	0.61	32	19	167	101
5-14	1,105	347	2	0.63	62	19	1,041	327
15-24	6560	1842	7	1.97	937	263	5,616	1577
25-44	6351	918	15	2.17	983	142	5,353	774
45-64	1262	279	9	1.99	226	50	1,027	227
65-74	200	135	2	1.35	29	20	169	114
75+	22	28	1	1.26	10	13	11	14
Missing	43				1		42	
<b>Female</b>	<b>5,133</b>	<b>228</b>	<b>20</b>	<b>0.89</b>	<b>579</b>	<b>26</b>	<b>4,534</b>	<b>201</b>
0-4	219	140	0	0.00	37	24	182	116
5-14	426	141	0	0.00	27	9	399	132
15-24	1738	506	5	1.46	152	44	1,581	460
25-44	2031	291	4	0.57	271	39	1,756	251
45-64	529	119	7	1.57	59	13	463	104
65-74	49	29	4		13	8	32	19
75+	105	78	0	0.00	20	15	85	63
Missing	37				0		37	

\* Excludes an estimated 2 deaths occurring in later years as a result of injuries sustained in 1993/94.



**Appendix Table C17 Unknown intent - Number and rate of injured persons by sex, age, and injury severity, 1993/94, Victoria.**

Age & gender	Total		Fatalities		Hospitalised		Non-hospitalised	
	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons	Number	Rate per 100,000 persons
<b>Total</b>	<b>1,235</b>	<b>28</b>	<b>11</b>	<b>0.25</b>	<b>368</b>	<b>8</b>	<b>856</b>	<b>19</b>
0-4	73	23	0	0.00	9	3	64	20
5-14	128	21	0	0.00	9	1	119	19
15-24	452	65	1	0.14	101	14	350	50
25-44	413	30	6	0.43	170	12	237	17
45-64	108	12	4	0.45	49	5	55	6
65-74	29	9	0	0.00	19	6	10	3
75+	24	11	0	0.00	11	5	13	6
Missing	8				0		8	
<b>Male</b>	<b>797</b>	<b>36</b>	<b>8</b>	<b>0.36</b>	<b>211</b>	<b>10</b>	<b>578</b>	<b>26</b>
0-4	40	24	0	0.00	5	3	35	21
5-14	93	29	0	0.00	3	1	90	28
15-24	306	86	0	0.00	62	17	244	69
25-44	265	38	4	0.58	99	14	162	23
45-64	70	16	4	0.89	29	6	37	8
65-74	15	10	0	0.00	9	6	6	4
75+	6	8	0	0.00	4	5	2	3
Missing	3				0		3	
<b>Female</b>	<b>438</b>	<b>19</b>	<b>3</b>	<b>0.13</b>	<b>157</b>	<b>7</b>	<b>278</b>	<b>12</b>
0-4	33	21	0	0.00	4	3	29	19
5-14	35	12	0	0.00	6	2	29	10
15-24	146	42	1	0.29	39	11	106	31
25-44	148	21	2	0.29	71	10	75	11
45-64	38	9	0	0.00	20	4	18	4
65-74	15	9	0	0.00	10	6	5	3
75+	18	13	0	0.00	7	5	11	8
Missing	5				0		5	



**APPENDIX D**

**ECONOMIC COSTS - DETAILED TABLES**



**Appendix Table D1 estimates of value of future production, Australia, 1993.**

Current age	Males					Females				
	Remaining paid work years	Remaining non-paid work years	Production (\$'000)			Remaining paid work years	Remaining non-paid work years	Production (\$'000)		
			Paid	Unpaid	Total			Paid	Unpaid	Total
0	45.4	27.0	185.87	67.82	254.94	38.5	40.8	115.54	185.87	301.41
1	45.4	26.0	199.68	72.84	272.53	38.5	39.8	123.08	199.68	322.76
2	45.4	25.0	213.50	77.86	291.36	38.5	38.8	131.87	213.50	345.37
3	45.4	24.0	228.57	84.14	312.71	38.5	37.8	141.91	228.57	369.23
4	45.4	23.0	244.90	89.17	334.06	38.5	36.8	150.71	244.90	395.60
5	45.4	22.0	261.22	95.45	357.93	38.5	35.8	162.01	261.22	423.23
6	45.4	21.0	280.06	102.98	381.79	38.5	34.8	173.31	280.06	453.37
7	45.4	20.0	298.90	109.26	409.42	38.5	33.8	184.61	298.90	484.77
8	45.4	19.0	320.25	118.05	438.30	38.5	32.8	198.43	320.25	518.68
9	45.4	18.0	342.85	125.59	468.44	38.5	31.8	212.24	342.85	555.10
10	45.4	17.0	366.72	134.38	501.10	38.5	30.8	227.31	366.72	594.03
11	45.4	16.0	391.83	144.43	536.26	38.5	29.8	242.38	391.83	635.47
12	45.4	15.0	419.46	154.47	573.94	38.5	28.8	259.97	419.46	679.43
13	45.4	14.0	449.60	164.52	614.12	38.5	27.8	277.55	449.60	727.15
14	45.4	13.0	481.00	175.82	656.82	38.5	26.8	297.64	481.00	778.64
15	45.4	12.0	513.65	188.38	703.29	38.5	25.8	317.74	514.91	832.65
16	44.4	12.0	528.72	192.15	720.87	34.5	28.8	324.02	523.70	847.72
17	43.5	12.0	545.05	194.66	739.71	31.3	31.0	329.04	532.49	862.79
18	42.5	12.1	561.38	198.43	759.81	28.9	32.5	336.58	542.54	879.11
19	41.6	12.1	578.96	202.20	781.16	27.6	32.8	342.85	552.59	895.44
20	40.7	12.1	596.54	207.22	803.76	27.0	32.4	349.13	562.63	911.77
21	39.7	12.1	599.05	207.22	806.27	26.6	31.9	346.62	566.40	911.77
22	38.8	12.1	601.57	209.73	810.04	26.4	31.1	342.85	570.17	911.77
23	37.9	12.2	604.08	210.99	815.06	25.5	31.0	339.09	572.68	911.77
24	36.9	12.2	606.59	212.24	818.83	26.8	28.8	335.32	577.70	911.77
25	36.0	12.2	609.10	213.50	822.60	27.2	27.4	330.30	581.47	911.77
26	35.0	12.2	604.08	213.50	817.58	27.6	26.0	324.02	580.22	904.23
27	34.1	12.2	597.80	212.24	811.30	27.8	24.7	321.50	576.45	896.70
28	33.1	12.3	591.52	212.24	803.76	27.9	23.7	321.50	573.94	894.19
29	32.2	12.3	585.24	212.24	797.48	27.8	22.8	310.20	571.42	881.63
30	31.2	12.3	578.96	210.99	789.95	27.4	22.3	305.18	567.66	872.84
31	30.3	12.3	571.42	210.99	782.41	26.7	22.0	298.90	565.15	864.04
32	29.3	12.3	563.89	210.99	773.62	25.9	21.8	292.62	599.05	855.25
33	28.3	12.3	556.35	209.73	766.09	25.0	21.8	286.34	558.87	845.21
34	27.4	12.4	547.56	209.73	757.29	23.9	21.9	280.06	555.10	835.16
35	26.4	12.4	538.77	208.48	747.25	22.8	22.0	272.53	551.33	825.11
36	25.4	12.4	527.47	208.48	735.94	21.7	22.2	264.99	550.07	815.06
37	24.5	12.4	512.40	204.71	717.11	20.6	22.3	256.20	548.82	805.02
38	23.5	12.4	498.58	203.45	700.78	19.5	22.4	247.41	546.31	793.71
39	22.6	12.4	483.51	200.94	684.45	18.4	22.5	237.36	545.05	782.41
40	21.6	12.5	467.19	198.43	666.87	17.5	22.5	228.57	543.80	771.11

**Appendix Table D1 (cont.) Estimates of value of future production, Australia, 1993.**

Current age	Males					Females				
	Remaining paid work years	Remaining non-paid work years	Production (\$'000)			Remaining paid work years	Remaining non-paid work years	Production (\$'000)		
			Paid	Unpaid	Total			Paid	Unpaid	Total
41	20.6	12.5	458.40	197.17	655.57	16.5	22.5	224.80	540.03	764.83
42	19.7	12.5	433.28	194.66	627.94	15.7	22.4	207.22	540.03	745.99
43	18.7	12.6	415.70	192.15	607.84	14.8	22.3	195.92	537.52	733.43
44	17.8	12.6	396.86	189.64	586.49	14.0	22.2	183.36	535.00	719.62
45	16.9	12.6	376.76	187.13	563.89	13.3	22.0	170.80	533.75	704.55
46	15.9	12.7	360.44	184.61	545.05	12.6	21.7	162.01	529.98	693.24
47	15.0	12.7	344.11	182.10	526.21	11.9	21.5	153.22	527.47	680.69
48	14.5	12.3	326.53	179.59	506.12	11.3	21.2	143.17	524.96	668.13
49	13.7	12.3	307.69	177.08	484.77	10.7	20.9	131.87	522.45	655.57
50	12.8	12.3	287.60	174.57	462.16	10.2	20.5	121.82	519.93	641.75
51	12.0	12.3	267.50	172.06	439.56	9.7	20.1	109.26	517.42	626.68
52	11.2	12.3	246.15	169.54	416.95	9.1	19.8	108.01	509.89	617.89
53	10.4	12.3	224.80	167.03	391.83	8.7	19.4	85.40	512.40	597.80
54	9.6	12.2	208.48	164.52	373.00	8.2	19.0	79.12	507.37	586.49
55	8.8	12.2	177.08	160.75	337.83	7.8	18.5	57.77	506.12	563.89
56	8.1	12.2	159.50	159.50	318.99	7.3	18.1	51.49	501.10	552.59
57	7.4	12.1	140.66	156.98	297.64	6.9	17.6	43.96	496.07	540.03
58	6.7	12.0	121.82	154.47	276.29	6.6	17.1	37.68	491.05	528.72
59	6.0	12.0	102.98	151.96	254.94	6.2	16.6	28.89	486.02	514.91
60	5.7	11.5	81.63	149.45	231.08	6.4	15.6	21.35	481.00	502.35
61	5.7	10.8	79.12	145.68	224.80	7.1	14.1	21.35	470.95	492.30
62	5.3	10.5	76.61	141.91	218.52	7.4	12.9	20.09	459.65	479.75
63	4.8	10.3	75.35	136.89	212.24	7.5	12.1	20.09	449.60	469.70
64	4.3	10.2	72.84	133.12	205.96	7.5	11.3	20.09	438.30	458.40
65	4.8	9.0	70.33	129.36	199.68	7.9	10.1	18.84	427.00	445.84
66	6.8	6.4	67.82	124.33	193.41	8.6	8.6	18.84	414.44	433.28
67	7.2	5.4	65.31	120.56	185.87	8.8	7.6	17.58	401.88	419.46
68	7.2	4.8	64.05	116.80	179.59	8.6	7.1	17.58	390.58	408.16
69	7.1	4.3	61.54	111.77	173.31	8.7	6.3	16.33	378.02	395.60
70	7.1	3.7	59.03	108.01	165.78	8.9	5.4	16.33	376.76	393.09

Derived from : Table IV.5 Estimates of value of future production, males, 1988 &  
Table IV.6 Estimates of value of future production, females, 1988  
(BTCE, 1992, Social costs of transport accidents in Australia, BTCE,  
Report No. 79. Appendix IV, pp105-108).

1988 estimates adjusted by annual CPI increase to 1993 for this study.

BTCE sources : ABS (1988, 1990a & 1990b) and Anderson & Ross (1987)

**Appendix Table D2 Cost of treatment (Victorian WorkCover Authority, hospitalised cases, by location of injury, non-motor vehicle accidents, Victoria, 1993/94, (3-4 years data).**

<b>Location of injury</b>	<b>Number of cases (WorkCover database)</b>	<b><i>Average treatment costs</i></b>	<b>Total treatment costs</b>
<b>Total</b>	<b>6,717</b>	<b>\$6,511</b>	<b>\$43,732,978</b>
Head	95	\$20,703	\$1,966,813
Eyes	59	\$4,136	\$244,031
Face (excl. eyes)	101	\$4,229	\$427,104
Neck	84	\$9,497	\$797,767
Chest	74	\$9,117	\$674,685
Abdomen/Pelvis	974	\$2,942	\$2,865,577
Spine/back	990	\$13,617	\$13,480,483
Upper Extremity	2,301	\$4,923	\$11,326,882
Lower Extremity	1,897	\$5,380	\$10,205,607
Multiple injuries	85	\$15,233	\$1,294,771
Other/unspecified	57	\$7,882	\$449,258

Source : Victorian WorkCover Authority, 1997.

NOTE : The average costs given here do not include the \$378 medical excess that applied to all cases compensated by WorkCover in 1993/94.

**Appendix Table D3 Cost of treatment (Victorian WorkCover Authority), hospitalised cases, by nature of injury, non-motor vehicle accidents, Victoria, 1993/94 (3-4 years data).**

<b>Nature of Injury</b>	<b>Number of cases (WorkCover database)</b>	<b>Average treatment costs</b>	<b>Total treatment costs</b>
<b>Total</b>	<b>6,717</b>	<b>\$6,511</b>	<b>\$43,732,978</b>
Fractures	730	\$9,345	\$6,822,138
Dislocations	88	\$10,272	\$903,937
Sprains/strains	3,287	\$7,372	\$24,231,628
Intracranial (not fracture)	29	\$9,078	\$263,264
Internal injury (chest/abdomen)	879	\$2,565	\$2,254,317
Open wound	1,031	\$4,085	\$4,211,797
Superficial injury (inc. foreign body)	103	\$3,412	\$351,393
Bruising	377	\$6,242	\$2,353,213
Burns	80	\$10,709	\$856,725
Poisoning	5	\$4,008	\$20,042
Near drowning	0		
Asphyxia	0		
Other/unspecified injuries	54	\$5,643	\$304,720
Multiple injuries	54	\$21,478	\$1,159,804

Source : Victorian WorkCover Authority, 1997.

NOTE : The average costs given here do not include the \$378 medical excess that applied to all cases compensated by WorkCover in 1993/94.



**Appendix Table D4 Motor vehicle traffic: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality *
<b>Total</b>	<b>\$570.542</b>	<b>\$125.686</b>	<b>\$155.373</b>	<b>\$289.484</b>	<b>\$17,181</b>	<b>\$3,785</b>	<b>\$4,751</b>	<b>\$575,515</b>
0-4	\$4.343	\$1.831	\$0.384	\$2.128	\$5,712	\$2,408	\$510	\$304,006
5-14	\$17.956	\$5.815	\$4.153	\$7.988	\$4,192	\$1,358	\$973	\$570,556
15-24	\$223.578	\$38.825	\$60.665	\$124.089	\$20,431	\$3,548	\$5,622	\$811,037
25-44	\$220.581	\$45.221	\$65.832	\$109.528	\$20,446	\$4,192	\$6,184	\$765,932
45-64	\$78.514	\$19.698	\$19.708	\$39.108	\$19,352	\$4,855	\$4,965	\$444,406
65-74	\$18.274	\$7.016	\$4.615	\$6.643	\$14,349	\$5,508	\$3,741	\$166,086
75+	\$7.255	\$7.255	\$0	\$0	\$7,198	\$7,198	\$0	\$0
Missing	\$0.041	\$0.026	\$0.015		\$432	\$271	\$161	
<b>Male</b>	<b>\$382.100</b>	<b>\$78.155</b>	<b>\$91.471</b>	<b>\$212.474</b>	<b>\$19,931</b>	<b>\$4,077</b>	<b>\$4,865</b>	<b>\$577,376</b>
0-4	\$3.273	\$1.090	\$0.357	\$1.827	\$8,062	\$2,684	\$892	\$304,439
5-14	\$11.179	\$3.812	\$2.587	\$4.779	\$4,174	\$1,424	\$969	\$531,001
15-24	\$161.027	\$26.303	\$37.681	\$97.044	\$24,401	\$3,986	\$5,818	\$788,972
25-44	\$156.029	\$29.949	\$41.584	\$84.496	\$24,225	\$4,650	\$6,572	\$747,749
45-64	\$40.383	\$10.361	\$7.767	\$22.254	\$20,517	\$5,264	\$4,068	\$377,190
65-74	\$7.126	\$3.562	\$1.488	\$2.075	\$13,186	\$6,591	\$2,855	\$109,219
75+	\$3.071	\$3.071	\$0	\$0	\$6,479	\$6,479	\$0	\$0
Missing	\$0.013	\$0.007	\$0.006		\$200	\$104	\$96	
<b>Female</b>	<b>\$188.442</b>	<b>\$47.530</b>	<b>\$63.902</b>	<b>\$77.010</b>	<b>\$13,425</b>	<b>\$3,386</b>	<b>\$4,597</b>	<b>\$570,442</b>
0-4	\$1.070	\$0.741	\$0.027	\$0.301	\$3,019	\$2,091	\$77	\$301,411
5-14	\$6.778	\$2.003	\$1.566	\$3.209	\$4,223	\$1,248	\$979	\$641,754
15-24	\$62.551	\$12.522	\$22.984	\$27.045	\$14,400	\$2,883	\$5,328	\$901,500
25-44	\$64.552	\$15.271	\$24.249	\$25.033	\$14,848	\$3,513	\$5,616	\$834,420
45-64	\$38.131	\$9.337	\$11.940	\$16.854	\$18,254	\$4,470	\$5,797	\$581,157
65-74	\$11.149	\$3.453	\$3.127	\$4.568	\$15,206	\$4,710	\$4,391	\$217,538
75+	\$4.184	\$4.184	\$0	\$0	\$7,837	\$7,837	\$0	\$0
Missing	\$0.028	\$0.019	\$0.009		\$937	\$635	\$302	

\* Based on 503 deaths, including an estimated 62 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table D5 Other transport: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality *
<b>Total</b>	<b>\$99.483</b>	<b>\$32.235</b>	<b>\$46.368</b>	<b>\$20.880</b>	<b>\$5,596</b>	<b>\$1,813</b>	<b>\$2,615</b>	<b>\$474,549</b>
0-4	\$2.710	\$1.097	\$0.404	\$1.209	\$2,588	\$1,048	\$387	\$302,353
5-14	\$17.288	\$8.037	\$8.869	\$0.383	\$3,197	\$1,486	\$1,640	\$383,043
15-24	\$28.362	\$7.993	\$15.560	\$4.810	\$5,984	\$1,686	\$3,287	\$801,606
25-44	\$34.037	\$8.388	\$16.268	\$9.381	\$8,074	\$1,990	\$3,871	\$721,641
45-64	\$14.235	\$4.792	\$4.347	\$5.097	\$8,980	\$3,023	\$2,765	\$392,055
65-74	\$2.140	\$1.226	\$0.914	\$0	\$5,494	\$3,147	\$2,365	\$0
75+	\$0.687	\$0.687	\$0	\$0	\$2,073	\$2,073	\$0	\$0
Missing	\$0.023	\$0.016	\$0.006		\$367	\$266	\$101	
<b>Male</b>	<b>\$66.656</b>	<b>\$20.879</b>	<b>\$27.859</b>	<b>\$17.918</b>	<b>\$6,181</b>	<b>\$1,936</b>	<b>\$2,592</b>	<b>\$471,514</b>
0-4	\$1.618	\$0.670	\$0.384	\$0.564	\$2,524	\$1,045	\$601	\$281,945
5-14	\$10.028	\$4.828	\$4.817	\$0.383	\$2,950	\$1,420	\$1,418	\$383,043
15-24	\$18.418	\$5.079	\$9.408	\$3.931	\$5,908	\$1,629	\$3,023	\$786,104
25-44	\$24.403	\$5.610	\$10.145	\$8.648	\$10,227	\$2,351	\$4,273	\$720,658
45-64	\$10.764	\$3.569	\$2.802	\$4.392	\$11,943	\$3,961	\$3,151	\$366,014
65-74	\$1.131	\$0.834	\$0.297	\$0	\$5,669	\$4,180	\$1,512	\$0
75+	\$0.279	\$0.279	\$0	\$0	\$3,108	\$3,108	\$0	\$0
Missing	\$0.016	\$0.011	\$0.005		\$315	\$219	\$96	
<b>Female</b>	<b>\$32.827</b>	<b>\$11.356</b>	<b>\$18.509</b>	<b>\$2.963</b>	<b>\$4,694</b>	<b>\$1,624</b>	<b>\$2,649</b>	<b>\$493,769</b>
0-4	\$1.092	\$0.427	\$0.020	\$0.645	\$2,690	\$1,052	\$48	\$322,761
5-14	\$7.260	\$3.209	\$4.051	\$0	\$3,615	\$1,598	\$2,017	\$0
15-24	\$9.944	\$2.913	\$6.152	\$0.879	\$6,128	\$1,795	\$3,793	\$879,115
25-44	\$9.634	\$2.778	\$6.123	\$0.733	\$5,266	\$1,519	\$3,349	\$733,433
45-64	\$3.472	\$1.222	\$1.545	\$0.705	\$5,076	\$1,787	\$2,262	\$704,547
65-74	\$1.009	\$0.392	\$0.617	\$0	\$5,310	\$2,062	\$3,248	\$0
75+	\$0.408	\$0.408	\$0	\$0	\$1,689	\$1,689	\$0	\$0
Missing	\$0.007	\$0.005	\$0.001		\$594	\$473	\$121	

\* Based on 44 deaths, including an estimated 3 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table D6 Drowning: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality *
<b>Total</b>	<b>\$19.547</b>	<b>\$0.904</b>	<b>\$0.103</b>	<b>\$18.540</b>	<b>\$61,866</b>	<b>\$2,861</b>	<b>\$372</b>	<b>\$463,511</b>
0-4	\$4.193	\$0.370	\$0.010	\$3.813	\$30,301	\$2,672	\$81	\$317,737
5-14	\$1.327	\$0.074	\$0.003	\$1.250	\$68,691	\$2,720	\$143	\$416,533
15-24	\$1.845	\$0.107	\$0.036	\$1.702	\$51,025	\$2,957	\$1,068	\$850,857
25-44	\$9.924	\$0.245	\$0.044	\$9.635	\$154,905	\$3,819	\$867	\$741,155
45-64	\$1.255	\$0.040	\$0.007	\$1.208	\$31,296	\$1,002	\$183	\$402,718
65-74	\$0.985	\$0.051	\$0.002	\$0.933	\$123,153	\$6,322	\$766	\$155,520
75+	\$0.018	\$0.018	\$0	\$0	\$8,856	\$8,856	\$0	\$0
Missing	\$0.000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Male</b>	<b>\$14.729</b>	<b>\$0.625</b>	<b>\$0.086</b>	<b>\$14.018</b>	<b>\$57,357</b>	<b>\$2,432</b>	<b>\$379</b>	<b>\$483,380</b>
0-4	\$1.698	\$0.208	\$0.007	\$1.483	\$15,236	\$1,867	\$66	\$296,638
5-14	\$1.297	\$0.046	\$0.002	\$1.250	\$74,762	\$2,662	\$117	\$416,533
15-24	\$0.943	\$0.101	\$0.036	\$0.806	\$29,744	\$3,183	\$1,171	\$806,274
25-44	\$8.954	\$0.189	\$0.034	\$8.731	\$178,503	\$3,761	\$903	\$727,565
45-64	\$1.255	\$0.040	\$0.007	\$1.208	\$31,296	\$1,002	\$183	\$402,718
65-74	\$0.572	\$0.031	\$0.000	\$0.540	\$114,308	\$6,208	\$474	\$135,007
75+	\$0.009	\$0.009	\$0	\$0	\$9,452	\$9,452	\$0	\$0
Missing	\$0.000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Female</b>	<b>\$4.818</b>	<b>\$0.279</b>	<b>\$0.016</b>	<b>\$4.522</b>	<b>\$91,440</b>	<b>\$4,721</b>	<b>\$339</b>	<b>\$411,129</b>
0-4	\$2.494	\$0.162	\$0.003	\$2.330	\$92,718	\$6,006	\$160	\$332,808
5-14	\$0.030	\$0.028	\$0.002	\$0	\$3,004	\$2,823	\$182	\$0
15-24	\$0.902	\$0.006	\$0.000	\$0.895	\$202,611	\$1,346	\$149	\$895,441
25-44	\$0.970	\$0.056	\$0.010	\$0.904	\$69,769	\$4,027	\$758	\$904,232
45-64	\$0.000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
65-74	\$0.414	\$0.020	\$0.001	\$0.393	\$137,896	\$6,513	\$1,057	\$196,545
75+	\$0.008	\$0.008	\$0	\$0	\$8,260	\$8,260	\$0	\$0
Missing	\$0.000	\$0	\$0	\$0	\$0	\$0	\$0	\$0

\* Based on 40 deaths, including an estimated 1 death occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table D7 Poisoning: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality *
<b>Total</b>	<b>\$108.242</b>	<b>\$26.461</b>	<b>\$33.763</b>	<b>\$48.018</b>	<b>\$10,255</b>	<b>\$2,507</b>	<b>\$3,222</b>	<b>\$623,609</b>
0-4	\$11.634	\$7.311	\$4.323	\$0	\$2,555	\$1,605	\$949	\$0
5-14	\$1.787	\$0.887	\$0.900	\$0	\$2,835	\$1,408	\$1,428	\$0
15-24	\$22.587	\$5.357	\$10.473	\$6.757	\$13,317	\$3,159	\$6,204	\$844,578
25-44	\$52.952	\$8.375	\$14.573	\$30.005	\$21,878	\$3,460	\$6,119	\$769,354
45-64	\$15.373	\$2.497	\$3.073	\$9.802	\$21,282	\$3,457	\$4,376	\$490,107
65-74	\$2.785	\$0.914	\$0.417	\$1.454	\$10,455	\$3,431	\$1,619	\$161,590
75+	\$1.095	\$1.095	\$0	\$0	\$4,754	\$4,754	\$0	\$0
Missing	\$0.029	\$0.024	\$0.005		\$808	\$679	\$129	
<b>Male</b>	<b>\$56.834</b>	<b>\$12.992</b>	<b>\$15.226</b>	<b>\$28.616</b>	<b>\$9,881</b>	<b>\$2,259</b>	<b>\$2,670</b>	<b>\$572,329</b>
0-4	\$6.577	\$4.197	\$2.380	\$0	\$2,627	\$1,676	\$951	\$0
5-14	\$0.793	\$0.418	\$0.375	\$0	\$2,304	\$1,215	\$1,089	\$0
15-24	\$10.342	\$2.182	\$4.108	\$4.053	\$11,512	\$2,429	\$4,598	\$810,544
25-44	\$29.468	\$4.095	\$6.878	\$18.495	\$20,880	\$2,902	\$4,961	\$739,812
45-64	\$7.514	\$1.275	\$1.232	\$5.007	\$22,185	\$3,764	\$3,770	\$417,265
65-74	\$1.766	\$0.452	\$0.253	\$1.061	\$11,095	\$2,839	\$1,674	\$132,652
75+	\$0.369	\$0.369	\$0	\$0	\$4,401	\$4,401	\$0	\$0
Missing	\$0.005	\$0.004	\$0.001		\$391	\$295	\$96	
<b>Female</b>	<b>\$51.408</b>	<b>\$13.469</b>	<b>\$18.537</b>	<b>\$19.401</b>	<b>\$10,702</b>	<b>\$2,804</b>	<b>\$3,881</b>	<b>\$718,572</b>
0-4	\$5.057	\$3.114	\$1.943	\$0	\$2,466	\$1,519	\$947	\$0
5-14	\$0.994	\$0.469	\$0.525	\$0	\$3,475	\$1,639	\$1,836	\$0
15-24	\$12.245	\$3.175	\$6.366	\$2.704	\$15,351	\$3,981	\$8,010	\$901,302
25-44	\$23.484	\$4.280	\$7.695	\$11.510	\$23,274	\$4,242	\$7,733	\$822,108
45-64	\$7.859	\$1.222	\$1.842	\$4.795	\$20,485	\$3,186	\$4,903	\$599,369
65-74	\$1.019	\$0.462	\$0.164	\$0.393	\$9,505	\$4,311	\$1,540	\$393,090
75+	\$0.726	\$0.726	\$0	\$0	\$4,956	\$4,956	\$0	\$0
Missing	\$0.024	\$0.020	\$0.003		\$1,037	\$890	\$147	

\* Based on 77 deaths.

**Appendix Table D8 Falls: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$557.250</b>	<b>\$270.322</b>	<b>\$263.424</b>	<b>\$23.503</b>	<b>\$4,333</b>	<b>\$2,102</b>	<b>\$2,052</b>	<b>\$97,119</b>
0-4	\$22.426	\$14.937	\$7.490	\$0	\$1,380	\$919	\$461	\$0
5-14	\$66.153	\$32.615	\$32.924	\$0.614	\$1,885	\$930	\$938	\$614,124
15-24	\$74.321	\$22.537	\$49.058	\$2.726	\$3,893	\$1,181	\$2,570	\$908,601
25-44	\$102.833	\$31.656	\$62.186	\$8.991	\$4,950	\$1,524	\$2,995	\$749,223
45-64	\$91.992	\$41.280	\$41.179	\$9.533	\$6,508	\$2,920	\$2,919	\$353,076
65-74	\$109.307	\$37.138	\$70.530	\$1.639	\$13,256	\$4,504	\$8,565	\$149,015
75+	\$90.011	\$90.011	\$0	\$0	\$6,206	\$6,206	\$0	\$0
Missing	\$0.206	\$0.148	\$0.057		\$398	\$287	\$111	
<b>Male</b>	<b>\$263.242</b>	<b>\$120.579</b>	<b>\$123.083</b>	<b>\$19.579</b>	<b>\$4,059</b>	<b>\$1,859</b>	<b>\$1,901</b>	<b>\$154,166</b>
0-4	\$12.648	\$8.706	\$3.942	\$0	\$1,372	\$945	\$428	\$0
5-14	\$40.426	\$20.414	\$19.398	\$0.614	\$2,146	\$1,083	\$1,030	\$614,124
15-24	\$50.087	\$16.542	\$33.544	\$0	\$4,087	\$1,350	\$2,737	\$0
25-44	\$69.600	\$21.713	\$38.897	\$8.991	\$5,870	\$1,831	\$3,284	\$749,223
45-64	\$48.266	\$22.242	\$17.031	\$8.993	\$7,621	\$3,512	\$2,700	\$345,886
65-74	\$22.696	\$11.467	\$10.248	\$0.981	\$8,706	\$4,399	\$3,943	\$122,660
75+	\$19.422	\$19.422	\$0	\$0	\$5,535	\$5,535	\$0	\$0
Missing	\$0.097	\$0.073	\$0.024		\$407	\$308	\$99	
<b>Female</b>	<b>\$294.008</b>	<b>\$149.743</b>	<b>\$140.341</b>	<b>\$3.924</b>	<b>\$4,612</b>	<b>\$2,349</b>	<b>\$2,206</b>	<b>\$34,119</b>
0-4	\$9.778	\$6.231	\$3.547	\$0	\$1,390	\$886	\$504	\$0
5-14	\$25.727	\$12.201	\$13.526	\$0	\$1,584	\$751	\$833	\$0
15-24	\$24.234	\$5.995	\$15.513	\$2.726	\$3,546	\$877	\$2,271	\$908,601
25-44	\$33.233	\$9.943	\$23.290	\$0	\$3,726	\$1,115	\$2,611	0
45-64	\$43.726	\$19.038	\$24.148	\$0.540	\$5,605	\$2,440	\$3,096	\$540,027
65-74	\$86.611	\$25.671	\$60.283	\$0.658	\$15,360	\$4,553	\$10,696	\$219,295
75+	\$70.589	\$70.589	\$0	\$0	\$6,421	\$6,421	\$0	\$0
Missing	\$0.109	\$0.075	\$0.034		\$390	\$269	\$121	

\* Based on 242 deaths, including an estimated 53 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table D9 Fire/Flames/Burns: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$49.109</b>	<b>\$24.169</b>	<b>\$14.897</b>	<b>\$10.043</b>	<b>\$4,741</b>	<b>\$2,333</b>	<b>\$1,442</b>	<b>\$344,775</b>
0-4	\$8.001	\$6.170	\$1.508	\$0.323	\$4,004	\$3,088	\$755	\$322,761
5-14	\$2.579	\$2.028	\$0.552	\$0	\$2,273	\$1,787	\$486	\$0
15-24	\$11.428	\$5.184	\$3.024	\$3.220	\$4,714	\$2,138	\$1,249	\$805,018
25-44	\$13.588	\$5.792	\$5.534	\$2.262	\$4,808	\$2,049	\$1,960	\$753,945
45-64	\$9.146	\$2.933	\$2.753	\$3.459	\$7,439	\$2,386	\$2,252	\$494,098
65-74	\$3.674	\$1.374	\$1.520	\$0.780	\$11,328	\$4,236	\$4,732	\$259,967
75+	\$0.683	\$0.683	\$0	\$0	\$1,825	\$1,825	\$0	\$0
Missing	\$0.009	\$0.004	\$0.005		\$190	\$91	\$99	
<b>Male</b>	<b>\$32.645</b>	<b>\$17.050</b>	<b>\$8.891</b>	<b>\$6.704</b>	<b>\$5,458</b>	<b>\$2,850</b>	<b>\$1,491</b>	<b>\$372,438</b>
0-4	\$4.758	\$3.854	\$0.904	\$0	\$4,292	\$3,476	\$815	\$0
5-14	\$2.343	\$1.830	\$0.513	\$0	\$3,856	\$3,013	\$844	\$0
15-24	\$9.791	\$4.245	\$2.326	\$3.220	\$6,770	\$2,935	\$1,613	\$805,018
25-44	\$8.950	\$4.514	\$3.771	\$0.666	\$4,779	\$2,410	\$2,015	\$665,615
45-64	\$5.007	\$1.609	\$0.927	\$2.472	\$8,524	\$2,739	\$1,591	\$494,314
65-74	\$1.467	\$0.673	\$0.447	\$0.347	\$13,624	\$6,253	\$4,230	\$173,311
75+	\$0.322	\$0.322	\$0	\$0	\$1,532	\$1,532	\$0	\$0
Missing	\$0.007	\$0.003	\$0.004		\$168	\$72	\$96	
<b>Female</b>	<b>\$16.464</b>	<b>\$7.119</b>	<b>\$6.005</b>	<b>\$3.339</b>	<b>\$3,761</b>	<b>\$1,626</b>	<b>\$1,376</b>	<b>\$278,282</b>
0-4	\$3.243	\$2.316	\$0.604	\$0.323	\$3,646	\$2,604	\$680	\$322,761
5-14	\$0.237	\$0.197	\$0.039	\$0	\$449	\$375	\$74	\$0
15-24	\$1.637	\$0.939	\$0.698	\$0	\$1,674	\$960	\$714	\$0
25-44	\$4.638	\$1.279	\$1.763	\$1.596	\$4,863	\$1,341	\$1,853	\$798,110
45-64	\$4.138	\$1.325	\$1.826	\$0.987	\$6,446	\$2,064	\$2,854	\$493,560
65-74	\$2.207	\$0.701	\$1.073	\$0.433	\$10,188	\$3,233	\$4,978	\$433,278
75+	\$0.362	\$0.362	\$0	\$0	\$2,200	\$2,200	\$0	\$0
Missing	\$0.002	\$0.001	\$0.001		\$345	\$225	\$121	

\* Based on 30 deaths.

**Appendix Table D10 Hit/Struck/Crush: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality *
<b>Total</b>	<b>\$187.753</b>	<b>\$61.185</b>	<b>\$117.714</b>	<b>\$8.854</b>	<b>\$2,146</b>	<b>\$699</b>	<b>\$1,346</b>	<b>\$590,257</b>
0-4	\$6.865	\$4.056	\$2.518	\$0.291	\$1,090	\$644	\$400	\$291,364
5-14	\$18.376	\$9.410	\$8.966	\$0	\$883	\$452	\$431	\$0
15-24	\$69.571	\$20.232	\$48.533	\$0.806	\$3,112	\$905	\$2,171	\$806,274
25-44	\$71.534	\$17.845	\$48.521	\$5.168	\$2,682	\$669	\$1,820	\$738,266
45-64	\$17.470	\$6.698	\$8.384	\$2.389	\$2,333	\$895	\$1,120	\$477,735
65-74	\$2.311	\$1.354	\$0.757	\$0.200	\$1,198	\$702	\$393	\$199,685
75+	\$1.509	\$1.509	\$0	\$0	\$949	\$949	\$0	\$0
Missing	\$0.117	\$0.082	\$0.036		\$346	\$241	\$105	
<b>Male</b>	<b>\$147.561</b>	<b>\$47.886</b>	<b>\$90.821</b>	<b>\$8.854</b>	<b>\$2,394</b>	<b>\$777</b>	<b>\$1,474</b>	<b>\$590,257</b>
0-4	\$4.175	\$2.473	\$1.411	\$0.291	\$1,130	\$669	\$382	\$291,364
5-14	\$12.821	\$6.629	\$6.192	\$0	\$916	\$474	\$442	\$0
15-24	\$57.473	\$17.109	\$39.557	\$0.806	\$3,293	\$980	\$2,267	\$806,274
25-44	\$57.999	\$15.103	\$37.728	\$5.168	\$2,925	\$762	\$1,903	\$738,266
45-64	\$13.382	\$5.336	\$5.657	\$2.389	\$2,729	\$1,088	\$1,155	\$477,735
65-74	\$1.176	\$0.721	\$0.255	\$0.200	\$1,155	\$708	\$251	\$199,685
75+	\$0.458	\$0.458	\$0	\$0	\$865	\$865	\$0	\$0
Missing	\$0.077	\$0.055	\$0.021		\$345	\$249	\$96	
<b>Female</b>	<b>\$40.192</b>	<b>\$13.300</b>	<b>\$26.893</b>	<b>\$0</b>	<b>\$1,556</b>	<b>\$515</b>	<b>\$1,041</b>	<b>\$0</b>
0-4	\$2.689	\$1.582	\$1.107	\$0	\$1,032	\$607	\$425	\$0
5-14	\$5.554	\$2.781	\$2.774	\$0	\$816	\$409	\$408	\$0
15-24	\$12.098	\$3.123	\$8.976	\$0	\$2,466	\$637	\$1,830	\$0
25-44	\$13.535	\$2.742	\$10.793	\$0	\$1,978	\$401	\$1,578	\$0
45-64	\$4.089	\$1.362	\$2.727	\$0	\$1,583	\$527	\$1,056	\$0
65-74	\$1.135	\$0.633	\$0.502	\$0	\$1,247	\$695	\$552	\$0
75+	\$1.051	\$1.051	\$0	\$0	\$992	\$992	\$0	\$0
Missing	\$0.041	\$0.027	\$0.014		\$348	\$227	\$121	

\* Based on 15 deaths, including an estimated 1 death occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table D11 Cutting/Piercing: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$99.648</b>	<b>\$30.179</b>	<b>\$67.188</b>	<b>\$2.281</b>	<b>\$2,106</b>	<b>\$638</b>	<b>\$1,420</b>	<b>\$760,224</b>
0-4	\$4.012	\$2.218	\$1.794	\$0	\$1,276	\$705	\$570	\$0
5-14	\$7.780	\$3.595	\$4.185	\$0	\$1,385	\$640	\$745	\$0
15-24	\$31.019	\$7.573	\$22.665	\$0.781	\$2,956	\$722	\$2,160	\$781,156
25-44	\$42.236	\$10.358	\$30.378	\$1.500	\$2,427	\$595	\$1,746	\$749,759
45-64	\$11.901	\$4.415	\$7.486	\$0	\$1,653	\$613	\$1,040	\$0
65-74	\$1.799	\$1.148	\$0.651	\$0	\$867	\$553	\$314	\$0
75+	\$0.829	\$0.829	\$0	\$0	\$750	\$750	\$0	\$0
Missing	\$0.073	\$0.044	\$0.029		\$253	\$151	\$102	
<b>Male</b>	<b>\$72.452</b>	<b>\$21.980</b>	<b>\$48.191</b>	<b>\$2.281</b>	<b>\$2,279</b>	<b>\$691</b>	<b>\$1,516</b>	<b>\$760,224</b>
0-4	\$2.515	\$1.410	\$1.105	\$0	\$1,274	\$714	\$560	\$0
5-14	\$5.192	\$2.471	\$2.721	\$0	\$1,466	\$698	\$768	\$0
15-24	\$24.173	\$6.017	\$17.375	\$0.781	\$3,097	\$771	\$2,227	\$781,156
25-44	\$31.375	\$7.807	\$22.069	\$1.500	\$2,589	\$644	\$1,821	\$749,759
45-64	\$7.865	\$3.221	\$4.645	\$0	\$1,723	\$706	\$1,018	\$0
65-74	\$0.979	\$0.724	\$0.255	\$0	\$805	\$595	\$210	\$0
75+	\$0.303	\$0.303	\$0	\$0	\$868	\$868	\$0	\$0
Missing	\$0.050	\$0.028	\$0.021		\$223	\$127	\$96	
<b>Female</b>	<b>\$27.196</b>	<b>\$8.199</b>	<b>\$18.997</b>	<b>\$0</b>	<b>\$1,751</b>	<b>\$528</b>	<b>\$1,223</b>	<b>\$0</b>
0-4	\$1.497	\$0.808	\$0.689	\$0	\$1,278	\$690	\$588	\$0
5-14	\$2.588	\$1.124	\$1.464	\$0	\$1,247	\$541	\$705	\$0
15-24	\$6.846	\$1.556	\$5.290	\$0	\$2,545	\$579	\$1,967	\$0
25-44	\$10.861	\$2.551	\$8.310	\$0	\$2,057	\$483	\$1,574	\$0
45-64	\$4.036	\$1.194	\$2.841	\$0	\$1,532	\$453	\$1,079	\$0
65-74	\$0.820	\$0.424	\$0.396	\$0	\$954	\$493	\$461	\$0
75+	\$0.526	\$0.526	\$0	\$0	\$696	\$696	\$0	\$0
Missing	\$0.023	\$0.015	\$0.008		\$355	\$234	\$121	

\* Based on 3 deaths.



Appendix Table D12

**Asphyxia: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$11.758</b>	<b>\$2.301</b>	<b>\$1.548</b>	<b>\$7.909</b>	<b>\$16,967</b>	<b>\$3,320</b>	<b>\$2,304</b>	<b>\$376,604</b>
0-4	\$0.891	\$0.538	\$0.039	\$0.313	\$5,171	\$3,126	\$231	\$312,714
5-14	\$2.190	\$0.142	\$0.006	\$2.042	\$27,747	\$1,799	\$79	\$510,514
15-24	\$0.915	\$0.089	\$0.014	\$0.811	\$10,313	\$1,006	\$163	\$811,297
25-44	\$2.598	\$0.251	\$0.098	\$2.249	\$15,876	\$1,531	\$610	\$749,759
45-64	\$3.498	\$0.813	\$0.973	\$1.712	\$30,727	\$7,140	\$8,940	\$342,436
65-74	\$1.428	\$0.230	\$0.417	\$0.781	\$37,145	\$5,986	\$12,102	\$195,289
75+	\$0.193	\$0.193	\$0	\$0	\$6,318	\$6,318	\$0	\$0
Missing	\$0.045	\$0.044	\$0.001		\$6,833	\$6,712	\$121	
<b>Male</b>	<b>\$7.654</b>	<b>\$1.246</b>	<b>\$0.511</b>	<b>\$5.897</b>	<b>\$20,010</b>	<b>\$3,258</b>	<b>\$1,391</b>	<b>\$393,118</b>
0-4	\$0.678	\$0.337	\$0.028	\$0.313	\$7,308	\$3,633	\$307	\$312,714
5-14	\$0.534	\$0.094	\$0.003	\$0.438	\$14,938	\$2,587	\$89	\$483,301
15-24	\$0.868	\$0.049	\$0.008	\$0.811	\$13,565	\$765	\$119	\$811,297
25-44	\$2.480	\$0.148	\$0.082	\$2.249	\$20,110	\$1,204	\$683	\$749,759
45-64	\$2.488	\$0.405	\$0.371	\$1.712	\$63,062	\$10,259	\$10,765	\$342,436
65-74	\$0.493	\$0.100	\$0.020	\$0.373	\$26,949	\$5,488	\$1,277	\$124,332
75+	\$0.072	\$0.072	\$0	\$0	\$8,005	\$8,005	\$0	\$0
Missing	\$0.042	\$0.042	\$0		\$0	\$0	\$0	
<b>Female</b>	<b>\$4.103</b>	<b>\$1.054</b>	<b>\$1.037</b>	<b>\$2.012</b>	<b>\$13,217</b>	<b>\$3,396</b>	<b>\$3,406</b>	<b>\$335,319</b>
0-4	\$0.213	\$0.202	\$0.011	\$0	\$2,677	\$2,535	\$142	\$0
5-14	\$1.656	\$0.049	\$0.003	\$1.604	\$38,346	\$1,146	\$70	\$534,585
15-24	\$0.047	\$0.040	\$0.007	\$0	\$1,904	\$1,631	\$273	\$0
25-44	\$0.118	\$0.102	\$0.016	\$0	\$2,923	\$2,531	\$392	\$0
45-64	\$1.010	\$0.408	\$0.602	\$0	\$13,581	\$5,486	\$8,095	\$0
65-74	\$0.935	\$0.130	\$0.397	\$0.408	\$46,396	\$6,437	\$20,741	\$408,160
75+	\$0.121	\$0.121	\$0	\$0	\$5,614	\$5,614	\$0	\$0
Missing	\$0.003	\$0.002	\$0.001		\$381	\$260	\$121	

\* Based on 21 deaths, including an estimated 1 death occurring in later years as a result of injuries sustained in 1993/94.

Appendix Table D13

**Other unintentional: Lifetime Cost of Injury by Age,  
Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$318.756</b>	<b>\$114.897</b>	<b>\$188.690</b>	<b>\$15.169</b>	<b>\$3,205</b>	<b>\$1,155</b>	<b>\$1,898</b>	<b>\$379,221</b>
0-4	\$10.282	\$6.141	\$4.141	\$0	\$1,204	\$719	\$485	\$0
5-14	\$19.089	\$8.869	\$9.606	\$0.614	\$1,457	\$677	\$733	\$614,124
15-24	\$75.258	\$22.015	\$50.150	\$3.092	\$3,679	\$1,076	\$2,452	\$772,993
25-44	\$133.180	\$39.339	\$88.762	\$5.080	\$3,667	\$1,083	\$2,444	\$725,707
45-64	\$57.944	\$23.876	\$28.973	\$5.094	\$3,770	\$1,553	\$1,887	\$363,876
65-74	\$15.773	\$7.448	\$7.036	\$1.289	\$5,294	\$2,500	\$2,370	\$128,853
75+	\$7.153	\$7.153	\$0	\$0	\$2,881	\$2,881	\$0	\$0
Missing	\$0.078	\$0.056	\$0.022		\$371	\$266	\$105	
<b>Male</b>	<b>\$210.008</b>	<b>\$75.224</b>	<b>\$120.503</b>	<b>\$14.281</b>	<b>\$3,191</b>	<b>\$1,143</b>	<b>\$1,832</b>	<b>\$408,027</b>
0-4	\$5.708	\$3.448	\$2.260	\$0	\$1,266	\$765	\$501	\$0
5-14	\$11.820	\$5.594	\$5.612	\$0.614	\$1,562	\$739	\$742	\$614,124
15-24	\$53.698	\$16.246	\$34.360	\$3.092	\$3,730	\$1,128	\$2,387	\$772,993
25-44	\$95.022	\$28.648	\$61.294	\$5.080	\$3,591	\$1,083	\$2,317	\$725,707
45-64	\$35.992	\$15.770	\$15.608	\$4.615	\$3,472	\$1,521	\$1,507	\$354,963
65-74	\$5.667	\$3.430	\$1.356	\$0.880	\$3,959	\$2,397	\$952	\$146,728
75+	\$2.052	\$2.052	\$0	\$0	\$2,195	\$2,195	\$0	\$0
Missing	\$0.048	\$0.035	\$0.013		\$355	\$259	\$96	
<b>Female</b>	<b>\$108.748</b>	<b>\$39.673</b>	<b>\$68.187</b>	<b>\$0.888</b>	<b>\$3,232</b>	<b>\$1,179</b>	<b>\$2,027</b>	<b>\$177,581</b>
0-4	\$4.574	\$2.693	\$1.882	\$0	\$1,135	\$668	\$467	\$0
5-14	\$7.268	\$3.275	\$3.993	\$0	\$1,314	\$592	\$722	\$0
15-24	\$21.560	\$5.769	\$15.791	\$0	\$3,558	\$952	\$2,606	\$0
25-44	\$38.158	\$10.691	\$27.467	\$0	\$3,872	\$1,085	\$2,787	\$0
45-64	\$21.951	\$8.106	\$13.365	\$0.480	\$4,387	\$1,620	\$2,672	\$479,745
65-74	\$10.106	\$4.018	\$5.680	\$0.408	\$6,529	\$2,596	\$3,679	\$102,040
75+	\$5.101	\$5.101	\$0	\$0	\$3,296	\$3,296	\$0	\$0
Missing	\$0.030	\$0.021	\$0.009		\$400	\$279	\$121	

\* Based on 40 deaths, including an estimated 2 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table D14 Suicide/Self-harm: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$428.407</b>	<b>\$40.384</b>	<b>\$62.762</b>	<b>\$325.261</b>	<b>\$51,540</b>	<b>\$4,859</b>	<b>\$8,079</b>	<b>\$597,906</b>
0-4	\$0.026	\$0.024	\$0.002	\$0	\$496	\$450	\$46	\$0
5-14	\$3.130	\$0.584	\$0.575	\$1.972	\$13,337	\$2,486	\$2,481	\$657,243
15-24	\$129.557	\$10.521	\$20.931	\$98.105	\$48,795	\$3,963	\$8,260	\$810,784
25-44	\$212.770	\$21.136	\$34.099	\$157.534	\$51,438	\$5,110	\$8,678	\$761,034
45-64	\$70.464	\$5.985	\$5.322	\$59.157	\$72,687	\$6,174	\$6,439	\$413,688
65-74	\$11.734	\$1.409	\$1.832	\$8.493	\$73,788	\$8,859	\$16,352	\$180,704
75+	\$0.722	\$0.722	\$0	\$0	\$7,610	\$7,610	\$0	\$0
Missing	\$0.005	\$0.004	\$0.001		\$521	\$420	\$100	
<b>Male</b>	<b>\$287.623</b>	<b>\$18.154</b>	<b>\$23.245</b>	<b>\$246.223</b>	<b>\$74,389</b>	<b>\$4,695</b>	<b>\$6,762</b>	<b>\$573,947</b>
0-4	\$0.014	\$0.012	\$0.002	\$0	\$330	\$287	\$43	\$0
5-14	\$1.324	\$0.124	\$0.007	\$1.193	\$10,394	\$970	\$56	\$596,542
15-24	\$95.685	\$4.721	\$8.243	\$82.721	\$80,616	\$3,978	\$7,611	\$795,395
25-44	\$137.430	\$9.638	\$13.101	\$114.691	\$71,627	\$5,023	\$7,428	\$739,945
45-64	\$47.498	\$2.834	\$1.850	\$42.814	\$102,628	\$6,124	\$5,333	\$369,089
65-74	\$5.365	\$0.519	\$0.042	\$4.803	\$70,118	\$6,781	\$1,023	\$137,238
75+	\$0.302	\$0.302	\$0	\$0	\$7,063	\$7,063	\$0	\$0
Missing	\$0.004	\$0.003	\$0.001		\$495	\$398	\$96	
<b>Female</b>	<b>\$140.785</b>	<b>\$22.230</b>	<b>\$12.586</b>	<b>\$79.038</b>	<b>\$31,668</b>	<b>\$5,000</b>	<b>\$9,125</b>	<b>\$687,285</b>
0-4	\$0.012	\$0.011	\$0.026	\$0	\$1,244	\$1,185	\$59	\$0
5-14	\$1.806	\$0.460	\$0.030	\$0.779	\$16,828	\$4,285	\$5,339	\$778,644
15-24	\$33.872	\$5.800	\$4.281	\$15.384	\$23,070	\$3,950	\$8,743	\$904,929
25-44	\$75.339	\$11.498	\$7.200	\$42.843	\$33,972	\$5,185	\$9,696	\$823,896
45-64	\$22.965	\$3.150	\$0.981	\$16.343	\$45,333	\$6,219	\$7,239	\$605,295
65-74	\$6.369	\$0.890	\$0.065	\$3.690	\$77,191	\$10,786	\$25,376	\$307,481
75+	\$0.420	\$0.420	\$0	\$0	\$8,059	\$8,059	\$0	\$0
Missing	\$0.001	\$0.001	\$0.004		\$652	\$531	\$121	

\* Based on 544 deaths, including an estimated 17 deaths occurring in later years as a result of injuries sustained in 1993/94.

Appendix Table D15

**Interpersonal violence: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality*
<b>Total</b>	<b>\$117.417</b>	<b>\$26.769</b>	<b>\$54.247</b>	<b>\$36.402</b>	<b>\$5,624</b>	<b>\$1,282</b>	<b>\$2,606</b>	<b>\$616,979</b>
0-4	\$1.167	\$0.781	\$0.052	\$0.344	\$2,786	\$1,864	\$125	\$334,064
5-14	\$2.413	\$0.925	\$0.579	\$0.909	\$1,576	\$604	\$379	\$454,628
15-24	\$43.527	\$10.111	\$23.414	\$10.002	\$5,246	\$1,219	\$2,826	\$833,484
25-44	\$53.395	\$11.471	\$26.831	\$15.093	\$6,369	\$1,368	\$3,208	\$754,654
45-64	\$14.351	\$2.701	\$3.057	\$8.593	\$8,009	\$1,508	\$1,722	\$505,468
65-74	\$2.203	\$0.432	\$0.300	\$1.471	\$8,844	\$1,735	\$1,233	\$245,104
75+	\$0.324	\$0.324	\$0	\$0	\$2,566	\$2,566	\$0	\$0
Missing	\$0.038	\$0.024	\$0.014		\$475	\$300	\$175	
<b>Male</b>	<b>\$84.296</b>	<b>\$20.099</b>	<b>\$41.660</b>	<b>\$22.537</b>	<b>\$5,354</b>	<b>\$1,277</b>	<b>\$2,652</b>	<b>\$593,069</b>
0-4	\$0.745	\$0.384	\$0.026	\$0.344	\$3,372	\$1,926	\$132	\$334,064
5-14	\$2.065	\$0.607	\$0.549	\$0.909	\$1,868	\$549	\$498	\$454,628
15-24	\$32.906	\$8.265	\$19.133	\$5.508	\$5,017	\$1,260	\$2,920	\$786,898
25-44	\$39.925	\$8.426	\$19.631	\$11.868	\$6,285	\$1,326	\$3,098	\$741,748
45-64	\$7.830	\$2.023	\$2.076	\$3.731	\$6,205	\$1,603	\$1,657	\$414,577
65-74	\$0.681	\$0.260	\$0.235	\$0.186	\$3,402	\$1,300	\$1,185	\$92,935
75+	\$0.115	\$0.115	\$0	\$0	\$5,306	\$5,306	\$0	\$0
Missing	\$0.029	\$0.019	\$0.010		\$668	\$446	\$222	
<b>Female</b>	<b>\$33.121</b>	<b>\$6.669</b>	<b>\$12.586</b>	<b>\$13.865</b>	<b>\$6,451</b>	<b>\$1,299</b>	<b>\$2,461</b>	<b>\$660,246</b>
0-4	\$0.422	\$0.396	\$0.026	\$0	\$1,925	\$1,807	\$118	\$0
5-14	\$0.348	\$0.318	\$0.030	\$0	\$817	\$747	\$70	\$0
15-24	\$10.621	\$1.847	\$4.281	\$4.494	\$6,113	\$1,063	\$2,471	\$898,705
25-44	\$13.469	\$3.044	\$7.200	\$3.225	\$6,631	\$1,499	\$3,551	\$806,280
45-64	\$6.521	\$0.678	\$0.981	\$4.862	\$12,305	\$1,280	\$1,879	\$607,720
65-74	\$1.521	\$0.172	\$0.065	\$1.285	\$31,162	\$3,520	\$1,447	\$321,189
75+	\$0.209	\$0.209	\$0	\$0	\$2,000	\$2,000	\$0	\$0
Missing	\$0.009	\$0.005	\$0.004		\$249	\$129	\$121	

\* Based on 59 deaths, including an estimated 2 deaths occurring in later years as a result of injuries sustained in 1993/94.

**Appendix Table D16 Unknown intent: Lifetime Cost of Injury by Age, Gender and Type of Cost, 1993-1994.**

Age & gender	Cost (millions)				Cost per Injured Person			
	Total	Direct	Indirect		Total	Direct	Indirect	
			Morbidity	Mortality			Morbidity	Mortality *
<b>Total</b>	<b>\$15.019</b>	<b>\$3.453</b>	<b>\$4.424</b>	<b>\$7.143</b>	<b>\$12,165</b>	<b>\$2,797</b>	<b>\$3,615</b>	<b>\$649,347</b>
0-4	\$0.088	\$0.082	\$0.005	\$0	\$1,202	\$1,128	\$74	\$0
5-14	\$0.106	\$0.099	\$0.007	\$0	\$827	\$770	\$57	\$0
15-24	\$3.087	\$0.839	\$1.337	\$0.912	\$6,832	\$1,856	\$2,965	\$911,767
25-44	\$9.055	\$1.792	\$2.893	\$4.370	\$21,922	\$4,338	\$7,107	\$728,306
45-64	\$2.400	\$0.407	\$0.132	\$1.861	\$22,313	\$3,782	\$1,274	\$465,302
65-74	\$0.204	\$0.155	\$0.049	\$0	\$6,937	\$5,282	\$1,655	\$0
75+	\$0.076	\$0.076	\$0	\$0	\$3,158	\$3,158	\$0	\$0
Missing	\$0.004	\$0.003	\$0.001		\$559	\$447	\$112	
<b>Male</b>	<b>\$9.448</b>	<b>\$1.864</b>	<b>\$2.916</b>	<b>\$4.668</b>	<b>\$11,862</b>	<b>\$2,340</b>	<b>\$3,698</b>	<b>\$583,512</b>
0-4	\$0.044	\$0.041	\$0.003	\$0	\$1,106	\$1,028	\$78	\$0
5-14	\$0.049	\$0.044	\$0.004	\$0	\$522	\$475	\$47	\$0
15-24	\$1.661	\$0.504	\$1.157	\$0	\$5,431	\$1,648	\$3,783	\$0
25-44	\$5.417	\$0.932	\$1.678	\$2.807	\$20,458	\$3,519	\$6,436	\$701,722
45-64	\$2.166	\$0.240	\$0.065	\$1.861	\$31,086	\$3,443	\$991	\$465,302
65-74	\$0.083	\$0.076	\$0.008	\$0	\$5,696	\$5,177	\$520	\$0
75+	\$0.026	\$0.026	\$0	\$0	\$4,368	\$4,368	\$0	\$0
Missing	\$0.002	\$0.001	\$0.000		\$572	\$475	\$96	
<b>Female</b>	<b>\$5.571</b>	<b>\$1.589</b>	<b>\$1.508</b>	<b>\$2.475</b>	<b>\$12,717</b>	<b>\$3,627</b>	<b>\$3,465</b>	<b>\$824,907</b>
0-4	\$0.044	\$0.041	\$0.002	\$0	\$1,317	\$1,249	\$69	\$0
5-14	\$0.057	\$0.055	\$0.003	\$0	\$1,632	\$1,551	\$81	\$0
15-24	\$1.426	\$0.334	\$0.180	\$0.912	\$9,768	\$2,291	\$1,239	\$911,767
25-44	\$3.637	\$0.860	\$1.214	\$1.563	\$24,536	\$5,801	\$8,304	\$781,476
45-64	\$0.234	\$0.167	\$0.067	\$0	\$6,169	\$4,405	\$1,764	\$0
65-74	\$0.120	\$0.079	\$0.041	\$0	\$8,172	\$5,387	\$2,785	\$0
75+	\$0.051	\$0.051	\$0	\$0	\$2,770	\$2,770	\$0	\$0
Missing	\$0.003	\$0.002	\$0.001		\$551	\$430	\$121	

\* Based on 11 deaths.



**APPENDIX E      PAID AND UNPAID PRODUCTION LOSSES BY  
LEVEL OF SEVERITY : METHODOLOGY AND  
TABLES OF RESULTS**





## **METHODOLOGY**

### **MORBIDITY (HOSPITALISATIONS)**

The following formula was used to calculate the paid production loss or lost earnings of injury victims for each age and gender group :

LOST EARNINGS = (labour force participation rate for age-group and gender) x (median daily earnings for age-group and gender) x (bed-days x 3) x (work-days/days in week = 5/7).

The earnings estimates used in this study for each age and gender were derived from earnings from full-time employees in their main jobs. The figures used were based on median weekly earnings (ABS, 1994a) plus labour on-costs of 21.2 percent. The estimates take into account the labour force participation rate for each age and gender group (ABS, 1994b) assuming that the distribution of injury victims is similar to that of the population at large in terms of employment. For cases of unknown age and/or gender, the average lost earnings of victims of known age and gender were applied. Loss of earnings is only calculated for work-days lost by applying a ratio of 5/7 to the estimated total days lost (bed-days x 3).

A large amount of productive but unpaid work is performed by both employed and non-employed persons. This includes household work and voluntary community work. When a person is incapacitated this production is also lost to the community. Following the BTCE (1992), this study uses the opportunity cost approach to value unpaid production. It is assumed that the median weekly earnings by age and gender best describes the opportunity cost of performing household and community work. Therefore the value of unpaid production time lost is assumed to be equal that of production time lost in paid work.

To calculate the value of unpaid production by members of the work-force for each age and gender group, the following formula was used :

UNPAID PRODUCTION LOSS (employed persons) = (LOST EARNINGS) x (average household work hours (employed person)/average paid work hours).

An estimate of the average time spent on labour force activities in a week by males and females was calculated from figures published by the Australian Bureau of Statistics (1994c, Table 2, p.9). Time spent on unpaid household and community work was taken from the 1992 Time Use Survey conducted by the ABS (1994d, Tables 1 &5).

Similar calculations were made to determine the value of unpaid production lost by unemployed victims of injury :

UNPAID PRODUCTION LOSS (unemployed persons) = (BED-DAYS x 3) x (work-days/days in week = 5/7) x (1 - labour force participation rate) x (median daily earnings) x (average household work hours (unemployed persons)/average paid work hours (employed persons)).

Separate calculations, based on the BTCE (1992) working life tables, were undertaken for victims of spinal cord injury, total and permanent incapacitation and nursing home admissions. Information about the labour force participation of persons with paraplegia and quadriplegia in Victoria (Murphy et al., 1997) was used to adjust the loss of earnings estimates for this group. Persons with paraplegia were assumed to be able to contribute in some way to household and community work, so unpaid production loss has been reduced by half for this group.



Appendix Table E1 : Total morbidity cost by age, gender and cause of injury (paid and unpaid production), Victoria, 1993/94 (\$ millions).

	Motor vehicle traffic	Other transport	Near drowning	Poisoning	Falls	Fire/ flames/ burns	Hit/ struck/ crush	Cutting/ piercing	Asphyxia	Other	UNINTENTIONAL	Self-inflicted	IPV	Unknown intent	INTENTIONAL	TOTAL
<b>Total</b>	<b>155.373</b>	<b>46.368</b>	<b>0.103</b>	<b>33.763</b>	<b>263.424</b>	<b>14.897</b>	<b>117.714</b>	<b>67.188</b>	<b>1.548</b>	<b>188.690</b>	<b>889.069</b>	<b>62.762</b>	<b>54.247</b>	<b>4.424</b>	<b>121.432</b>	<b>1010.501</b>
<b>Age</b>																
0-4*	0.384	0.404	0.010	4.323	7.490	1.508	2.518	1.794	0.039	4.141	22.611	0.002	0.052	0.005	0.060	22.671
5-14*	4.153	8.869	0.003	0.900	32.924	0.552	8.966	4.185	0.006	9.606	70.163	0.575	0.579	0.007	1.161	71.324
15-24	60.665	15.560	0.036	10.473	49.058	3.024	48.533	22.665	0.014	50.150	260.179	20.931	23.414	1.337	45.682	305.861
25-44	65.832	16.268	0.044	14.573	62.186	5.534	48.521	30.378	0.098	88.762	332.197	34.099	26.831	2.893	63.823	396.020
45-64	19.708	4.347	0.007	3.073	41.179	2.753	8.384	7.486	0.973	28.973	116.883	5.322	3.057	0.132	8.510	125.393
65-74	4.615	0.914	0.002	0.417	70.530	1.520	0.757	0.651	0.417	7.036	86.860	1.832	0.300	0.049	2.180	89.040
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.015	0.006	0.000	0.005	0.057	0.005	0.036	0.029	0.001	0.022	0.176	0.001	0.014	0.001	0.016	0.192
<b>Male</b>	<b>91.471</b>	<b>27.859</b>	<b>0.086</b>	<b>15.226</b>	<b>123.083</b>	<b>8.891</b>	<b>90.821</b>	<b>48.191</b>	<b>0.511</b>	<b>120.503</b>	<b>526.644</b>	<b>23.245</b>	<b>41.660</b>	<b>2.916</b>	<b>67.822</b>	<b>594.465</b>
0-4*	0.357	0.384	0.007	2.380	3.942	0.904	1.411	1.105	0.028	2.260	12.778	0.002	0.026	0.003	0.031	12.809
5-14*	2.587	4.817	0.002	0.375	19.398	0.513	6.192	2.721	0.003	5.612	42.221	0.007	0.549	0.004	0.561	42.782
15-24	37.681	9.408	0.036	4.108	33.544	2.326	39.557	17.375	0.008	34.360	178.403	8.243	19.133	1.157	28.533	206.936
25-44	41.584	10.145	0.034	6.878	38.897	3.771	37.728	22.069	0.082	61.294	222.481	13.101	19.631	1.678	34.410	256.892
45-64	7.767	2.802	0.007	1.232	17.031	0.927	5.657	4.645	0.371	15.608	56.045	1.850	2.076	0.065	3.991	60.036
65-74	1.488	0.297	0.000	0.253	10.248	0.447	0.255	0.255	0.020	1.356	14.620	0.042	0.235	0.008	0.285	14.905
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.006	0.005	0.000	0.001	0.024	0.004	0.021	0.021	0.000	0.013	0.096	0.001	0.010	0.000	0.011	0.107
<b>Female</b>	<b>63.902</b>	<b>18.509</b>	<b>0.016</b>	<b>18.537</b>	<b>140.341</b>	<b>6.005</b>	<b>26.893</b>	<b>18.997</b>	<b>1.037</b>	<b>68.187</b>	<b>362.426</b>	<b>39.517</b>	<b>12.586</b>	<b>1.508</b>	<b>53.610</b>	<b>416.036</b>
0-4*	0.027	0.020	0.003	1.943	3.547	0.604	1.107	0.689	0.011	1.882	9.833	0.001	0.026	0.002	0.029	9.862
5-14*	1.566	4.051	0.002	0.525	13.526	0.039	2.774	1.464	0.003	3.993	27.942	0.568	0.030	0.003	0.600	28.543
15-24	22.984	6.152	0.001	6.366	15.513	0.698	8.976	5.290	0.007	15.791	81.776	12.688	4.281	0.180	17.149	98.925
25-44	24.249	6.123	0.010	7.695	23.290	1.763	10.793	8.310	0.016	27.467	109.715	20.999	7.200	1.214	29.413	139.128
45-64	11.940	1.545	0.000	1.842	24.148	1.826	2.727	2.841	0.602	13.365	60.838	3.472	0.981	0.067	4.519	65.357
65-74	3.127	0.617	0.001	0.164	60.283	1.073	0.502	0.396	0.397	5.680	72.241	1.789	0.065	0.041	1.895	74.136
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.009	0.001	0.000	0.003	0.034	0.001	0.014	0.008	0.001	0.009	0.080	0.000	0.004	0.001	0.005	0.085

\* Includes lifetime morbidity costs of long-term child injury victims and lost production of care-givers (in the work-force) of child injury victims.

Appendix Table E2 : Paid production loss by age, gender and cause of injury, Victoria, 1993/94 (\$ millions).

	Motor vehicle traffic	Other transport	Near drowning	Poisoning	Falls	Fire/ flames/ burns	Hit/ struck/ crush	Cutting/ piercing	Asphyxia	Other	UNINTENTIONAL	Self-inflicted	IPV	Unknown intent	INTENTIONAL	TOTAL
<b>Total</b>	<b>84.329</b>	<b>26.173</b>	<b>0.069</b>	<b>17.092</b>	<b>110.206</b>	<b>7.673</b>	<b>74.620</b>	<b>40.440</b>	<b>0.413</b>	<b>104.468</b>	<b>465.484</b>	<b>29.331</b>	<b>34.174</b>	<b>2.607</b>	<b>66.112</b>	<b>531.596</b>
<b>Age</b>																
0-4*	0.303	0.312	0.010	2.578	4.552	0.964	1.570	1.129	0.039	2.550	14.007	0.002	0.052	0.005	0.060	14.067
5-14*	2.732	5.274	0.003	0.497	20.353	0.438	6.040	2.690	0.006	5.998	44.031	0.242	0.446	0.007	0.696	44.726
15-24	36.435	9.236	0.023	5.459	30.644	1.956	32.485	14.792	0.007	31.190	162.229	10.905	15.718	0.920	27.543	189.772
25-44	38.286	9.426	0.028	7.549	36.027	3.323	30.873	18.738	0.064	53.520	197.835	16.589	16.583	1.620	34.792	232.627
45-64	5.978	1.815	0.004	0.929	13.133	0.815	3.566	3.004	0.277	10.636	40.158	1.516	1.292	0.052	2.860	43.018
65-74	0.587	0.108	0.000	0.078	5.472	0.174	0.068	0.071	0.019	0.562	7.138	0.076	0.075	0.002	0.152	7.290
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.007	0.004	0.000	0.002	0.026	0.003	0.018	0.016	0.000	0.011	0.087	0.001	0.008	0.000	0.009	0.095
<b>Male</b>	<b>64.806</b>	<b>19.794</b>	<b>0.060</b>	<b>10.809</b>	<b>83.126</b>	<b>6.172</b>	<b>65.287</b>	<b>34.224</b>	<b>0.299</b>	<b>84.398</b>	<b>368.976</b>	<b>16.572</b>	<b>29.914</b>	<b>2.110</b>	<b>48.596</b>	<b>417.572</b>
0-4*	0.276	0.292	0.007	1.777	3.003	0.690	1.078	0.834	0.028	1.715	9.700	0.002	0.026	0.003	0.031	9.731
5-14*	1.995	3.605	0.002	0.281	14.492	0.399	4.714	2.043	0.003	4.229	31.762	0.007	0.417	0.004	0.428	32.190
15-24	27.654	6.895	0.022	3.030	24.744	1.696	29.074	12.780	0.005	25.184	131.084	6.076	14.089	0.853	21.018	152.102
25-44	30.031	7.334	0.024	4.960	28.097	2.713	27.184	15.901	0.058	44.151	160.454	9.441	14.150	1.209	24.800	185.255
45-64	4.368	1.580	0.004	0.687	9.589	0.536	3.167	2.591	0.202	8.750	31.475	1.039	1.154	0.038	2.231	33.706
65-74	0.478	0.085	0.000	0.075	3.185	0.136	0.056	0.060	0.003	0.360	4.437	0.006	0.073	0.001	0.081	4.518
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.004	0.003	0.000	0.001	0.015	0.003	0.014	0.014	0.000	0.009	0.063	0.001	0.006	0.000	0.007	0.070
<b>Female</b>	<b>19.523</b>	<b>6.379</b>	<b>0.009</b>	<b>6.283</b>	<b>27.080</b>	<b>1.501</b>	<b>9.333</b>	<b>6.216</b>	<b>0.114</b>	<b>20.070</b>	<b>96.508</b>	<b>12.759</b>	<b>4.260</b>	<b>0.498</b>	<b>17.517</b>	<b>114.025</b>
0-4*	0.027	0.020	0.003	0.801	1.549	0.274	0.492	0.295	0.011	0.835	4.307	0.001	0.026	0.002	0.029	4.336
5-14*	0.737	1.669	0.002	0.216	5.861	0.039	1.326	0.647	0.003	1.769	12.269	0.235	0.030	0.003	0.268	12.536
15-24	8.781	2.341	0.000	2.430	5.900	0.260	3.411	2.012	0.002	6.006	31.144	4.828	1.630	0.068	6.526	37.670
25-44	8.255	2.092	0.004	2.590	7.930	0.610	3.689	2.836	0.006	9.369	37.380	7.148	2.433	0.411	9.992	47.372
45-64	1.611	0.234	0.000	0.242	3.544	0.279	0.399	0.413	0.075	1.886	8.683	0.478	0.138	0.013	0.630	9.312
65-74	0.109	0.022	0.000	0.004	2.286	0.038	0.012	0.011	0.016	0.202	2.701	0.069	0.002	0.001	0.072	2.773
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.003	0.000	0.000	0.001	0.010	0.000	0.004	0.002	0.000	0.003	0.024	0.000	0.001	0.000	0.002	0.025

\* Includes paid production losses of long-term (totally and permanently incapacitated) child injury victims and lost production of care-givers (in the work-force) of child injury victims.

Appendix Table E3 : Unpaid production loss by age, gender and cause of injury, Victoria, 1993/94 (\$ millions).

	Motor vehicle traffic	Other transport	Near drowning	Poisoning	Falls	Fire/ flames/ burns	Hit/ struck/ crush	Cutting/ piercing	Asphyxia	Other	UNINTENTIONAL	Self-inflicted	IPV	Unknown intent	INTENTIONAL	TOTAL
<b>Total</b>	<b>71.044</b>	<b>20.195</b>	<b>0.034</b>	<b>16.671</b>	<b>153.219</b>	<b>7.224</b>	<b>43.094</b>	<b>26.748</b>	<b>1.135</b>	<b>84.222</b>	<b>423.586</b>	<b>33.431</b>	<b>20.072</b>	<b>1.817</b>	<b>55.320</b>	<b>478.905</b>
<b>Age</b>																
0-4*	0.081	0.092	0.000	1.745	2.938	0.544	0.948	0.665	0.000	1.591	8.604	0.000	0.000	0.000	0.000	8.604
5-14*	1.421	3.594	0.000	0.403	12.571	0.113	2.926	1.495	0.000	3.608	26.132	0.333	0.133	0.000	0.465	26.598
15-24	24.229	6.324	0.014	5.014	18.413	1.068	16.048	7.873	0.007	18.960	97.951	10.026	7.696	0.417	18.138	116.089
25-44	27.546	6.843	0.016	7.023	26.159	2.211	17.648	11.640	0.034	35.242	134.362	17.510	10.248	1.273	29.031	163.393
45-64	13.730	2.532	0.003	2.144	28.046	1.939	4.818	4.481	0.696	18.337	76.725	3.805	1.765	0.080	5.650	82.375
65-74	4.029	0.807	0.001	0.339	65.059	1.347	0.689	0.580	0.398	6.474	79.722	1.756	0.225	0.046	2.028	81.750
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.008	0.003	0.000	0.003	0.032	0.002	0.017	0.013	0.001	0.011	0.089	0.000	0.007	0.000	0.007	0.096
<b>Male</b>	<b>26.665</b>	<b>8.065</b>	<b>0.026</b>	<b>4.417</b>	<b>39.957</b>	<b>2.719</b>	<b>25.534</b>	<b>13.967</b>	<b>0.212</b>	<b>36.105</b>	<b>157.668</b>	<b>6.673</b>	<b>11.746</b>	<b>0.807</b>	<b>19.226</b>	<b>176.894</b>
0-4*	0.081	0.092	0.000	0.603	0.939	0.214	0.333	0.272	0.000	0.544	3.078	0.000	0.000	0.000	0.000	3.078
5-14*	0.592	1.213	0.000	0.094	4.906	0.113	1.478	0.678	0.000	1.384	10.459	0.000	0.133	0.000	0.133	10.591
15-24	10.027	2.513	0.013	1.078	8.801	0.630	10.484	4.595	0.003	9.176	47.319	2.166	5.044	0.305	7.515	54.834
25-44	11.552	2.812	0.010	1.918	10.799	1.058	10.543	6.167	0.024	17.143	62.027	3.659	5.481	0.469	9.610	71.637
45-64	3.400	1.222	0.003	0.545	7.441	0.391	2.489	2.053	0.168	6.857	24.570	0.811	0.922	0.027	1.760	26.330
65-74	1.011	0.212	0.000	0.179	7.063	0.311	0.199	0.195	0.017	0.996	10.183	0.036	0.162	0.006	0.204	10.387
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.002	0.002	0.000	0.000	0.008	0.001	0.007	0.007	0.000	0.004	0.033	0.000	0.003	0.000	0.004	0.037
<b>Female</b>	<b>44.380</b>	<b>12.130</b>	<b>0.007</b>	<b>12.254</b>	<b>113.261</b>	<b>4.505</b>	<b>17.560</b>	<b>12.781</b>	<b>0.923</b>	<b>48.117</b>	<b>265.918</b>	<b>26.758</b>	<b>8.326</b>	<b>1.010</b>	<b>36.094</b>	<b>302.011</b>
0-4*	0.000	0.000	0.000	1.142	1.999	0.330	0.615	0.393	0.000	1.047	5.526	0.000	0.000	0.000	0.000	5.526
5-14*	0.829	2.382	0.000	0.309	7.665	0.000	1.448	0.817	0.000	2.224	15.674	0.333	0.000	0.000	0.333	16.007
15-24	14.203	3.811	0.000	3.936	9.613	0.438	5.565	3.278	0.004	9.784	50.632	7.860	2.651	0.112	10.623	61.255
25-44	15.994	4.031	0.006	5.105	15.360	1.153	7.104	5.473	0.010	18.099	72.335	13.851	4.766	0.804	19.421	91.756
45-64	10.330	1.311	0.000	1.599	20.605	1.548	2.328	2.428	0.527	11.479	52.155	2.994	0.842	0.053	3.890	56.045
65-74	3.018	0.595	0.001	0.160	57.996	1.035	0.490	0.386	0.381	5.478	69.540	1.720	0.063	0.040	1.823	71.363
75+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Missing	0.006	0.001	0.000	0.002	0.024	0.000	0.010	0.006	0.001	0.006	0.056	0.000	0.003	0.000	0.004	0.060

\* Unpaid production losses of long-term (totally and permanently incapacitated) child victims of injury.

