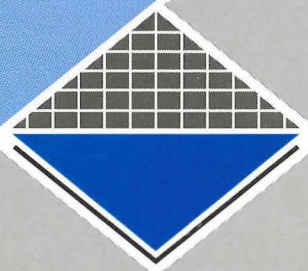
Road Injury Information Program
Report Series, Number 2

Road Injury in Australia

by
Peter J. O'Connor



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Abstract:
This statistical report contains a selection of information from the **National Road Injury Database** for 1990. The database has been developed by the Road Injury Information Program from State/Territory hospital separations data. Also included in the report are a selection of tables from the Federal Office of Road Safety's "**Fatality File**" for 1990, which is based on Police and Coroner's reports on all road deaths in Australia.

The road injury hospitalisation data presented here provide a better picture of road injury in Australia than has previously been available. The data have, however, limitations which should be borne in mind when using the report eg. a small amount of double counting due to re-admissions and inter-hospital transfers and State differences in data definitions.

The information presented will enable a better targeting of safety problems. For example, information on the rate of head injury in road crashes in Australia will enable development of goals for a targeted level of reduction in such injury. It can also be used to influence priority setting eg. information on the apparent severity of pedestrian injury and lower limb injuries may lead to a shift in priorities in treatment and prevention.

Further information about the Road Injury Information Program and any requests for data should be addressed to:

Assistant Director
Road Injury & Major Trauma
National Injury Surveillance Unit

FOREWORD

The Road Injury Information Program was initiated in 1991 by the National Injury Surveillance Unit through a funding allocation from the Department of Health, Housing, Local Government and Community Services. The program aims to improve the national data on the incidence and severity of road injury so as to facilitate improved monitoring and prevention.

This report contains a selection of information from the **National Road Injury Database** for 1990. The database has been developed by the Road Injury Information Program from State/Territory hospital separations data. Also included in the report are a selection of tables from the Federal Office of Road Safety's "**Fatality File**", which is based on Police and Coroner's reports on all road deaths in Australia.

The road injury hospitalisation data presented here provide a better picture of road injury in Australia than has previously been available. The data have, however, limitations which should be borne in mind when using the report eg. a small amount of double counting due to re-admissions and inter-hospital transfers and State differences in data definitions.

The information presented will enable a better targeting of safety problems. For example, information on the rate of head injury in road crashes in Australia will enable development of goals for a targeted level of reduction in such injury. It can also be used to influence priority setting eg. information on the apparent severity of pedestrian injury and lower limb injuries may lead to a shift in priorities in treatment and prevention.

Tabulation of data and production of all figures presented in the report was undertaken by Mr. R. Trembath from Reark Research (Adelaide).

Further information about the Road Injury Information Program and any requests for data should be addressed to:

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CONTENTS

CONTENTS (contd)

CONTENTS (contd)

CONTENTS (contd)

CONTENTS (contd)

CONTENTS (contd)

Figures

1. INTRODUCTION

BACKGROUND

Information of road injury fatalities in Australia is available from several sources, including routine mortality data (Australian Bureau of Statistics, 1992); and the very detailed bi-annual "Fatality File" compiled by the Federal Office of Road Safety.

Sources of information on non-fatal road injury are less well developed. At national level, the only substantial source has been based on police reports of road crashes (see Federal Office of Road Safety, Road crashes resulting in hospitalisation 1988 Australia, Canberra). This source has been shown to underestimate hospitalised road injury cases by about a third (O'Connor, 1992), underenumeration being particularly great for certain classes of road user ie. pedal cyclists, motorcyclists and pedestrians (see Federal Office of Road Safety, Road crashes resulting in hospitalisation: Australia 1990, Canberra).

The present report presents the findings of the first systematic use of hospital in-patient morbidity data to produce national estimates of hospitalisation due to road injury. The hospitalisation data have been analysed and presented so as to facilitate comparisons with information on fatalities. The report focuses in particular on trends and patterns of injury by injury severity and bodily location of injury. The chief characteristic of injured people considered here is their road user type at the time of injury. This variable is widely used for road safety purposes, and distinguishes groups of cases with substantially different patterns of injury. The only demographic variable considered in this report is age. Age is known to be associated with variation in road injury type, and in levels of risk. It is also the basis for several regulatory measures mainly concerning licensing. Other demographic and socio-economic factors will be considered in future reports.

The primary purpose of this report is to disseminate promptly the data which have been compiled in developing the National Injury Surveillance Unit's National Road Injury Database for 1990. Much work remains to be done in analysing the findings, and refining the methods prior to developing the 1992 database.

METHOD

This report presents tabulations which provide information about changes in injuries incurred as a result of road crashes in Australia during the calender year 1990. Rates of injury within the general population and trends in case numbers between 1988 and 1990 are also detailed. Injury rates are based upon the 1990 estimated resident population data from the 1991 Census (Australian Bureau of Statistics, 1993).

The data is derived from two main sources, the hospital in-patient morbidity collections maintained by State and Territory Government health authorities and the Federal Office of Road Safety "Fatality File". Descriptions of these sources and of their use for this project can be found in Appendix A.

"Fatality File" case data include assessments of injury severity according to the Abbreviated Injury Scale (AIS), and the Injury Severity Score (ISS) which can be derived from AIS scores. Hospital in-patient morbidity data do not include severity scores. For this report injury severity was estimated for hospital morbidity records on the basis of ICD-9CM diagnoses codes. The computer program ICDMAP was used to map the diagnoses into AIS and ISS severity scores and injury body regions. Due to unavailability of more than five diagnosis codes from some states and territories, analysis of severity was restricted to the first five coded diagnoses. This may result in some truncation of estimated ISS scores. Included in the tabulations on injury severity is information on the maximum AIS (MAIS), which is the highest single AIS code in a patient with multiple injuries. MAIS is important in motor vehicle injury research concerned with vehicle design changes, although it has been shown to be a relatively poor predictor of death when compared to the Baker et al (1974) ISS (AAAM Committee on Injury Scaling, 1990).

The official estimate for road traffic deaths in Australia for 1990, from the Federal Office of Road Safety, is 2,331. The base for the fatality tables presented in Sections 2 and 3 of this report is 2,164. The lower figure excludes a small number of cases which do not fit the formal definitions for inclusion in the FORS Fatality File (n = 13) and a larger number of non-trauma deaths in road traffic crashes (n = 154).

All tables and figures should be read in conjunction with the information provided in Appendix A, the glossary of terms and the Federal Office of Road Safety "Fatality File" documentation for 1988 and 1990 (unpublished). In particular, the limitations of the hospital in-patient morbidity data should be borne in mind. Some characteristics discussed in Appendix A are:

1. Data unavailability: data for some jurisdictions and some years was unavailable at the time the report was prepared.

2. Double-counting: about one-third of deaths recorded in the Federal Office of Road Safety (FORS) "Fatality File" will also appear in the in-patient morbidity records due to death in hospital, or after discharge from hospital, within 30 days of the crash, this period being defined by FORS as the reporting period for road crash fatalities included in the "Fatality file". The number is small in relation to the total number of in-patient episodes described, but may account for an important proportion of the more severely-injured in-patients.

3. Repeat admissions and transfers: some road injuries lead to more than one episode of in-patient care, either at the same hospital, or at another. Thus, the hospitalisation data represent episodes of service rather than incidence of road injury. Available information suggest that less than 8% of road-injury in-patient episodes are re-admissions (see O'Connor, 1992).

4. Data system differences: despite moves toward national consistency in reporting of in-patient episodes, differences existed in the data used for this report. Some apparent state to state differences between road injury in-patient rates are likely to be due to data system differences.

In this report, adjustments have been made to allow for data unavailability in calculating national estimates. No adjustment has been made for the other factors described.

FORMAT OF THE REPORT

The tabulations are presented in three Sections. Section 2 contains frequency counts for the main variables, population-based rates and changes in case numbers since 1988. Section 3 contains detailed crosstabulations for fatal cases. Section 4 contains detailed crosstabulations of hospital admission data. Comments on tabulations presented are invited to assist with preparation of the next report on road injury in Australia which will be based on 1992 hospital and fatality data.

A brief overview of the data reported, highlighting the main features is presented below.

BRIEF DESCRIPTIVE SUMMARY

ANNUAL TOTAL OF FATALITIES AND SEPARATIONS

Of 2331 road fatalities recorded in 1990, 2164 fitted the definitions for inclusion in the Federal Office of Road Safety "Fatality File" (excluding non-trauma fatalities in road crashes). There were an estimated 39626 hospital separations for road injury in that year. The ratio of road fatalities:hospital separations was therefore 1:17 (see table 2.1).

Between 1988 and 1990 road deaths decreased by 19% whereas hospital separations decreased by only 12%.

AGE

Road crash case numbers of both deaths and hospital separations are highest at ages 15-24 (see figures 2.1 and 2.2), fatalities peaking at 20-24 years, while admissions are a little more frequent at 15-19 years. The relatively high rates of road fatality seen at ages 70 and above is less apparent in in-patient data.

An approximation of the case fatality rate (actually the ratio of the number of fatalities to hospital separations expressed per 100 separations) for each age group can be calculated from table 2.1 (see below).

Road Deaths per 100 road injury hospital separations, Australia 1990, by age

Age group	Deaths/100 separations
0- 4	4.08
5-14	2.22
15-19	4.57
20-24	6.09
25-29	5.79
30-39	5.57
40-49	6.26
50-59	5.91
60-69	8.63
70+	10.02

The ratio is highest for the elderly and lowest for 5-14 year olds. The elderly are more likely than the young to die from the injuries sustained in road crashes.

ROAD USER TYPE

Comparison of the proportions of hospital separations and fatalities by road user type show that vehicle occupants dominate amongst both hospital separations and deaths (see figures 2.3 & 2.4). Occupants comprise 45% of separations and 65% of fatalities. Pedestrians account for a slightly higher proportion of fatalities (15%0 than of admissions (12%). Cyclists, who account for 16% of hospital separations, make up only 4% of fatalities.

Variations in fatalities and hospital separations by age group and road user type are presented in tables 3.1 & 4.1. Young road users (ie. 0-14 years) die primarily as passengers in motor vehicles and as pedal cyclists. 15-24 year olds die primarily as drivers and passengers in motor vehicles. Road users aged 70+ are the only adult group to die more frequently as pedestrians than as drivers. The general pattern is similar for hospital separations (see table 4.1). The large number of cyclist separations at age 5-14 years is notable.

INJURY SEVERITY

Table 4.18 shows that the injury recorded as the principal diagnosis tends to be the most life-threatening injury sustained, especially where the severity of injury of the principal diagnosis is at least moderate.

The distribution of AIS and ISS injury severity scores amongst hospital separations and fatalities are presented in tables 2.10 and 2.11. The high population based rate of moderate injury amongst separations is notable. The greatest reduction in AIS injury severity between 1988 and 1990 for hospital separations occurred in the critical category, which is the most severe injury category for separations from hospital. There is evidence of a substantial decline in most ISS injury severity categories for hospital separations.

Injury severity is fairly uniformly distributed across road user type at least for fatalities (see table 3.9). Hospital separations show a different pattern. Table 4.14 shows that pedestrians have the highest average ISS injury severity score. Comparison of the distribution of AIS scores (for principal diagnosis) of pedestrians and all road users shows a greater proportion of pedestrians at each AIS level above minor injury. Motorcycle riders have an elevated level of moderate - serious injuries. Cyclists have a substantially higher proportion of moderate injuries than other road user types and a lower proportion of more severe injuries.

INJURY BY BODY REGION

The head is the body region most severely injured in one-third of road deaths (34%). Injuries to the chest (23%) and multiple injuries (21%) are also common in cases of road fatality.

Table 2.4 shows that the rate of injury to the lower extremities (as principal diagnosis) is 48/100,000 compared with 46 for the head; 33 for upper extremity; 16 for chest; and 12 for spine. The number of head injuries (as principal diagnosis) declined by 23% between 1988 and 1990, compared with a 12% decline for all body regions.

For pedal cyclists, the body region to show the greatest reduction between 1988 and 1990 is injury to the head (see table 2.6). Cyclist head injuries decreased by 16% while facial injury numbers increased by 14%. The reduction in head injuries could reflect to some extent the effects of increased helmet wearing.

Severity of injury has been presented, in table 4.16, by road user type and body region of injury for hospital separations (principal diagnosis only). It can be seen that a higher proportion of pedestrian head injuries are in the serious to critical categories than are driver head injuries (39% cf. 22% respectively). Pedal cyclists are the road users with the lowest proportion of head injuries in the serious to critical range (ie. 15%).

NATURE OF INJURY

Table 2.3 presents hospital separations data by nature and bodily location of injury. Intracranial injury (excl. skull fracture) makes up 16% of principal diagnoses, with a population based rate of 38/100,000. Between 1988 and 1990 intracranial injuries, as principal diagnosis, declined by 25% which is the greatest decline of any injury type.

Lower limb fracture is also a common principal diagnosis, with a rate of 36/100,000. This type of injury has declined slowly over recent years (6%), relative to most other types of injury (12% decrease for all principal diagnosis injury types). Fractures of the spine and trunk and fractures of the upper limbs, which also comprise a substantial proportion of principal diagnoses (11% & 12% respectively), have decreased by even smaller proportions (2% and 3% respectively).

LENGTH OF STAY IN HOSPITAL

Vehicle occupants comprise 45% of road injury hospital separations (see fig. 2.3) and 45% of total occupied bed days due to road injury (see fig. 2.13). Only 12% of hospital separations are pedestrians (see fig. 2.3), but they comprise 19% of total bed days. Figure 2.16 shows that pedestrians have a substantially higher average length of stay than any other road user group. The high proportion of elderly persons amongst hospitalised pedestrians (see table 4.1) may account for this pattern.

36% of total occupied bed days for road injury are consumed by cases having lower limb injuries (see fig. 2.14). Average length of stay is highest for spinal injury and lower limb injuries (see fig. 2.17).

TIMING OF DEATH IN ROAD CRASHES

The timing of death in relation to provision of treatment or transport is presented in table 3.11. Vehicle occupants make up the majority of cases that die at any time before or after provision of treatment or transport. 22% of drivers die instantaneously in road crashes compared with only 11% of pedestrians; 13% of cyclists; 18% of motorcycle riders; and 21% of passengers. Half of all cases that die in hospital are vehicle occupants. Pedestrians make up more than a quarter of the cases that die in hospital.

2. SUMMARY DATA

The tables presented in this section provide a summary of the injury data. Both hospital separations and fatalities are reported in most tables.

The tables provide frequency counts and percentages, rates of injury per 100,000 of the Australian estimated resident population for 1990 (based on 1991 Census) and the percentage change in the number of cases between 1988 and 1990. The number of cases recorded for 1988 is the base for the calculation of the percentage change. In those instances where the 1988 population base is less than 50 cases the percentage change between 1988 and 1990 was not calculated.

All tables and figures should be read in conjunction with the information provided in Appendix A, the glossary of terms and the Federal Office of Road Safety "Fatality File" documentation for 1988 and 1990 (see Appendix C).

Table 2.1. Road Fatalities and Hospital Separations, Australia 1990, by Age group (Case Number, Rate/100,000 and % Change in Number Since 1988)

	Fatalities *			Hospital Separations **		
	1990			1990		
	Number	Rate per 100,000 +	% change in number 1988 - 90	Number	Rate per 100,000 +	% change in number 1988 - 90
Age Group						
0 - 4 yrs	47 2.2%	4	- 17.5%	1151 2.9%	92	- 15.4%
5 - 14 yrs	128 5.9%	5	- 8.6%	5779 14.6%	232	- 6.9%
15 - 19 yrs	332 15.3%	24	- 21.1%	7266 18.3%	518	- 14.0%
20 - 24 yrs	374 17.3%	28	- 24.0%	6138 15.5%	452	- 15.0%
25 - 29 yrs	244 11.3%	17	- 27.4%	4216 10.6%	296	- 13.4%
30 - 39 yrs	296 13.7%	11	- 17.8%	5310 13.4%	196	- 7.6%
40 - 49 yrs	207 9.6%	9	- 10.0%	3306 8.3%	148	- 9.3%
50 - 59 yrs	135 6.2%	9	- 28.6%	2286 5.8%	148	- 11.5%
60 - 69 yrs	165 7.6%	12	- 9.8%	1912 4.8%	137	- 14.1%
70 or more years	226 10.4%	18	- 21.0%	2256 5.7%	183	- 10.9%
Not known	10 0.5%	. .	. .	6 0.0%	. .	. .
Total	2164 100%	13	- 19.8%	39626 100%	232	- 11.6%

\+ Age specific rate. The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

. . Percentage base less than 50 cases for 1988.

* Source data: FORS Fatality File 1988 & 1990. See FORS publications for details.

** Source data: State and Territory hospital morbidity data. See App. A for details.

Table 2.2 Road Fatalities and Hospital Separations, Australia 1990, by Road User Type (Case Number, Rate/100,000 and % Change in Number Since 1988)

	Fatalities *			Hospital Separations **		
	1990			1990		
	Number	Rate per 100,000 +	% change in number 1988 - 90	Number	Rate per 100,000 +	% change in number 1988 - 90
Road User Type						
Driver	855 39.5%	5	- 19.3%	10338 26.1%	61	- 6.5%
Passenger in motor vehicle	542 25.0%	3	- 19.1%	7598 19.2%	45	- 17.2%
Motor cycle rider	251 11.6%	2	- 21.3%	5135 13.0%	30	- 17.2%
Pedal cyclist	77 3.6%	0.5	- 4.9%	6266 15.8%	37	- 2.4%
Pedestrian	398 18.4%	2	- 21.5%	4754 12.0%	28	- 8.3%
Unspecified / other	41 1.9%	0.2	- 33.9%	5535 14.0%	32	- 18.5%
Total	2164 100%	13	- 19.8%	39626 100%	232	- 11.6%

. . Percentage base less than 50 cases for 1988

+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

* Source data: FORS Fatality File 1988 & 1990. See FORS publications for details.

** Source data: State and Territory hospital morbidity data. See App. A for details.

Table 2.3 Road Injury Hospital Separations, Australia 1990
By Nature of Injury* for Principal Diagnosis and All Diagnoses
(Case Number, Rate/100,000 and % Change in Number Since 1988)

	Principal Diagnosis			All Diagnoses **		
	1990			1990		
	Number	Rate per 100,000 +	% change in number 1988 - 90	Number	Rate per 100,000 +	% change in number 1988 - 90
Nature of injury *						
Fracture of skull	2544 6.4%	15	- 14.8%	4457 6.0%	26	- 18.1%
Fracture of spine / trunk	4416 11.1%	26	- 2.1%	8175 11.0%	48	- 9.7%
Fracture of upper limb	4694 11.8%	28	- 3.1%	8150 10.9%	48	- 8.3%
Fracture of lower limb	6004 15.2%	35	- 6.1%	9289 12.5%	54	- 11.9%
Dislocation	776 2.0%	5	- 10.1%	1652 2.2%	10	- 12.3%
Sprains/strains of joints & adj. muscles	862 2.2%	5	- 8.0%	1660 2.2%	10	- 17.3%
Intracranial injury excl. skull fracture	6465 16.3%	38	- 24.9%	8194 11.0%	48	- 29.1%
Internal injury of chest, abdomen, pelv.	1442 3.6%	8	- 10.0%	3545 4.8%	21	- 8.8%
Open wound of head, neck & trunk	2841 7.2%	17	- 15.6%	7891 10.6%	46	- 19.6%
Open wound of upper limb	807 2.0%	5	- 9.0%	2127 2.9%	13	- 4.0%
Open wound of lower limb	1184 3.0%	7	- 10.5%	2785 3.7%	16	- 6.4%
Injury to blood vessels	92 .2%	0.5	37.3%	225 0.3%	1	- 2.2%
Superficial inj.	844 2.1%	5	- 20.6%	3911 5.2%	23	- 4.8%
Contusion with intact skin surface	1857 4.7%	11	- 7.5%	5242 7.0%	31	- 4.1%
Crushing injury	66 .2%	0.4	- 24.1%	96 0.1%	0.6	- 33.2%
Foreign body through orifice	12 .0%	0.1	. .	41 0.1%	0.2	- 18.0%
Injury to nerves/ /spinal cord	204 .5%	1.2	- 10.1%	513 0.7%	3	- 18.4%
Other	4516 11.4%	27	- 10.4%	6648 8.9%	39	6.9%
Total	39626 100%	232	- 11.6%	74601 100%	437	- 12.3%

. . Percentage base less than 50 cases for 1988.
+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.
* Nature of injury = Major 30 categories from ICD9 "Injury & Poisoning" chapter.
** All diagnoses is all injuries recorded for any separation. Principal diagnosis is the principal injury recorded for any separation. Table 4.19 indicates that principal diagnosis correlates strongly with maximum AIS. Therefore principal diagnosis is a good indicator of the most severe injury suffered for any separation.
Source data: State and Territory hospital morbidity data. See App. A for details.

Table 2.4 Road Injury Hospital Separations, Australia 1990
By Body Region of Injury for Principal Diagnosis and All Diagnoses
(Case Number, Rate/100,000 and % Change in Number Since 1988)

	Principal Diagnosis			All Diagnoses *		
	1990		% change	1990		% change
	Number	Rate per 100,000 +	in number 1988 - 90	Number	Rate per 100,000 +	in number 1988 - 90
Body region						
External	6756 17.0%	40	- 13.6%	20115 26.9%	118	- 9.4%
Head	7719 19.5%	45	- 23.3%	9968 13.3%	58	- 27.8%
Face	2136 5.4%	13	- 14.1%	4728 6.3%	28	- 14.2%
Chest	2640 6.7%	16	- 4.2%	5797 7.8%	34	- 9.0%
Abdomen	1014 2.6%	6	- 9.5%	1976 2.6%	12	- 5.0%
Spine	1994 5.0%	12	- 4.5%	3182 4.3%	19	- 12.0%
Upper extremity	5570 14.1%	33	- 3.7%	9921 13.3%	58	- 7.5%
Lower extremity	8070 20.4%	47	- 6.6%	13686 18.3%	80	- 12.1%
Unspecified / other	3727 9.4%	22	- 8.8%	5334 7.1%	31	37.9%
Total	39626 100%	232	- 11.6%	74707 100%	438	- 10.8%

* All diagnoses is all injuries recorded for any separation. Principal diagnosis is the principal injury recorded for any separation. Table 4.9 indicates that principal diagnosis correlates strongly with maximum AIS. Therefore principal diagnosis is a good indicator of the most severe injury suffered for any separation.

+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

Source data: State and Territory hospital morbidity data. See App. A for details.

Table 2.5 Road Fatalities and Hospital Separations, Australia 1990
By Body Region in Which The Most Severe Injury Was Sustained
(Case Numbers, Rate/100,000 and % Change in Number Since 1988)

	Fatalities *			Hospital Separations **		
	1990			1990		
	Number	Rate per 100,000 +	% change in number 1988 - 90 ***	Number	Rate per 100,000 +	% change in number 1988 - 90 ***
Body region ****						
External	30 1.4%	0.2	. .	4218 10.6%	25	4.7%
Head	744 34.4%	4	7.4%	6418 16.2%	38	- 19.4%
Face	1 0.0%	< .1	. .	857 2.2%	5	- 12.2%
Chest	488 22.6%	3	- 10.6%	2181 5.5%	13	7.5%
Abdomen	68 3.1%	0.4	- 52.4%	709 1.8%	4	4.9%
Spine	68 3.1%	0.4	- 53.1%	1756 4.4%	10	7.2%
Upper extremity	3 0.1%	< .1	. .	4029 10.2%	24	33.6%
Lower extremity	19 0.9%	0.1	. .	5806 14.7%	34	13.5%
Multiple	456 21.1%	3	53.5%	9924 25.0%	58	- 36.2%
Unspecified / other *****	287 13.3%	2	95.2%	3728 9.4%	22	- 3.1%
Total	2164 100%	13	- 19.8%	39626 100%	232	- 11.6%

. . Percentage base less than 50 cases for 1988

+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

* Source data: FORS Fatality File 1988 & 1990. See FORS publications for details.

** Source data: State and Territory hospital morbidity data. See App. A for details.

*** In 1990 up to twelve injuries were recorded in the Fatality File data base compared to 10 in 1988.

**** Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the multiple body region category.

***** There was an increase in the number of fatal cases which did not appear to receive an autopsy (as indicated by absence of an autopsy form) between 1988 and 1990, which accounts for the increase in 'unspecified/other'.

Table 2.6 Road Injury Hospital Separations, Australia 1990
By Road User Type and Body Region of Principal Diagnosis
(Case Number, Rate/100,000 and % Change in Number Since 1988)

Road user type	Body region - Principal diagnosis									Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Unspecified / other	
Driver	1934	1874	763	1254	247	728	944	1514	1080	10338
	18.9%	18.1%	7.4%	12.1%	2.4%	7.0%	9.1%	14.6%	10.4%	100.0%
Rate/100,000 +	11	11	5	7	1	4	6	9	6	
% change 88/90	2.4%	-19.2%	-18.4%	3.6%	-13.0%	12.3%	- 5.7%	-11.0%	0.7%	
Passenger in motor vehicle	1410	1473	477	756	313	598	745	1010	816	7598
	18.6%	19.4%	6.3%	9.9%	4.1%	7.9%	9.8%	13.3%	10.7%	100.0%
Rate/100,000 +	8	9	3	4	2	4	4	6	5	
% change 88/90	-25.9%	-22.6%	-20.5%	-14.4%	- 2.8%	- 0.7%	-11.5%	-15.1%	-12.4%	
Motor cycle rider	783	578	143	149	131	165	1105	1794	287	5135
	15.2%	11.3%	2.8%	2.9%	2.5%	3.2%	21.5%	34.9%	5.6%	100.0%
Rate/100,000 +	5	3	0.8	0.9	0.8	1	7	11	2	
% change 88/90	- 9.6%	-31.4%	-10.6%	-15.3%	-27.2%	-25.7%	- 6.8%	-16.4%	-33.3%	
Pedal cyclist	989	1707	359	58	171	73	1663	983	265	6266
	15.8%	27.2%	5.7%	.9%	2.7%	1.2%	26.5%	15.7%	4.2%	100.0%
Rate/100,000 +	6	10	2	0.3	1	0.4	10	6	2	
% change 88/90	- 2.0%	-16.3%	14.0%	- 7.9%	0%	- 1.4%	9.3%	3.3%	- 4.3%	
Pedestrian	622	1210	93	119	69	61	442	1841	297	4754
	13.1%	25.5%	1.9%	2.5%	1.4%	1.3%	9.3%	38.7%	6.3%	100.0%
Rate/100,000 +	4	7	0.5	0.7	0.4	0.4	3	11	2	
% change 88/90	4.5%	-10.6%	-32.6%	-6.3%	-13.8%	-57.9%	-5.6%	-5.3%	-10.0%	
Un specified / other	1018	877	301	304	84	368	672	928	982	5535
	18.4%	15.9%	5.4%	5.5%	1.5%	6.7%	12.1%	16.8%	17.7%	100.0%
Rate/100,000 +	6	5	2	2	0.5	2	4	5	6	
% change 88/90	-24.5%	-25.6%	-24.8%	-7.3%	-16.0%	-13.4%	-15.2%	2.0%	-24.9%	
Total	6756	7719	2136	2640	1014	1994	5570	8070	3727	39626
	17.0%	19.5%	5.4%	6.7%	2.6%	5.0%	14.1%	20.4%	9.4%	100.0%

+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

Source data: State and Territory hospital morbidity data. See App. A for details.

Table 2.7 Road Injury Hospital Separations, Australia 1990
By Road User Type and Body Region of the Most Severe Injury Sustained
(Case Number, Rate/100,000 and % Change in Number Since 1988)

Road user type	Body region of most severe injury *										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Multiple	Unspec./ other	
Driver	1121	1565	238	1044	166	587	550	954	3038	1076	10338
	10.8%	15.1%	2.3%	10.1%	1.6%	5.7%	5.3%	9.2%	29.4%	10.4%	100.0%
Rate/100,000 +	7	9	1	6	1	3	3	6	18	6	
% change 88/90	39.8%	-19.2%	-29.6%	18.2%	- 8.8%	9.7%	23.0%	6.6%	-29.2%	30.6%	
Passenger in motor vehicle	839	1226	189	627	198	561	483	688	1922	866	7598
	11.0%	16.1%	2.5%	8.2%	2.6%	7.4%	6.4%	9.1%	25.3%	11.4%	100.0%
Rate/100,000 +	5	7	1	4	1	3	3	4	11	5	
% change 88/90	-6.8%	-19.7%	- 1.6%	2.8%	11.2%	32.6%	28.5%	- 9.1%	-38.9%	19.9%	
Motor cycle rider	544	436	52	117	95	150	740	1314	1397	289	5135
	10.6%	8.5%	1.0%	2.3%	1.9%	2.9%	14.4%	25.6%	27.2%	5.6%	100.0%
Rate/100,000 +	3	3	0.3	0.7	0.6	0.9	4	8	8	2	
% change 88/90	7.5%	-28.2%	30.0%	1.7%	3.3%	-16.7%	36.8%	12.4%	-45.6%	-35.2%	
Pedal cyclist	668	1538	203	44	148	75	1499	826	986	278	6266
	10.7%	24.5%	3.2%	.7%	2.4%	1.2%	23.9%	13.2%	15.7%	4.4%	100.0%
Rate/100,000 +	4	9	1	0.3	0.9	0.4	9	5	6	2	
% change 88/90	0.1%	-23.9%	- 0.5%	-12.0%	8.0%	17.2%	47.2%	8.4%	-49.5%	-14.2%	
Pedestrian	329	914	35	102	36	73	272	1355	1385	255	4754
	6.9%	19.2%	.7%	2.1%	.7%	1.5%	5.7%	28.5%	29.1%	5.4%	100.0%
Rate/100,000 +	2	5	0.2	0.6	0.2	0.4	2	8	8	2	
% change 88/90	10.0%	0.8%	-34.0%	- 7.3%	. .	-1.4%	50.3%	22.1%	-27.7%	30.1%	
Un specified / other	717	739	140	248	66	310	486	669	1196	964	5535
	13.0%	13.4%	2.5%	4.5%	1.2%	5.6%	8.8%	12.1%	21.6%	17.4%	100.0%
Rate/100,000 +	4	4	0.8	2	0.4	2	3	4	7	6	
% change 88/90	-16.3%	-23.6%	- 6.7%	- 3.9%	- 2.9%	-14.1%	7.5%	59.3%	-28.6%	-27.7%	
Total	4218	6418	857	2181	709	1756	4029	5806	9924	3728	39626
	10.6%	16.2%	2.2%	5.5%	1.8%	4.4%	10.2%	14.7%	25.0%	9.4%	100.0%

. . Percentage base less than 50 cases for 1988
+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.
* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.
Source data: State and Territory hospital morbidity data. See App. A for details.

Table 2.8 Road Fatalities, Australia 1990
By Road User Type and Body Region of The Most Severe Injury Sustained
(Case Number, Rate/100,000 and % Change in Number Since 1988) **

	Body region of most severe injury *										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Multiple	Unspec./ other	
Road user type											
Driver	19	271		224	28	17		3	175	118	855
	2.2%	31.7%		26.2%	3.3%	2.0%		0.4%	20.5%	13.8%	100.0%
Rate/100,000 +	0.1	2		1	0.2	0.1		< .1	1	0.7	
% change 88/90	. .	8.0%		- 8.2%	- 46.2%	- 69.1%		. .	- 54.4%	118.5%	
Passenger in motor vehicle	10	170		121	17	21	1	7	107	88	542
	1.8%	31.4%		22.3%	3.1%	3.9%	.2%	1.3%	19.7%	16.2%	100.0%
Rate/100,000 +	0.1	1		0.7	0.1	0.1	< .1	< .1	0.6	0.5	
% change 88/90	. .	3.7%		- 16.6%	- 55.3%	- 38.2%	. .	. .	- 53.9%	109.5%	
Motor cycle rider		99		51	10	10	1	3	52	25	251
		39.4%		20.3%	4.0%	4.0%	.4%	1.2%	20.7%	10.0%	100.0%
Rate/100,000 +		0.6		0.3	0.1	0.1	< .1	< .1	0.3	0.1	
% change 88/90		20.7%		- 30.1	. .	. .	. .	. .	- 54.8%	. .	
Pedal cyclist		34	1	11	2			2	16	11	77
		44.2%	1.3%	14.3%	2.6%			2.6%	20.8%	14.3%	100.0%
Rate/100,000 +		0.2	< .1	0.1	< .1			< .1	0.1	0.1	
% change 88/90		. .	. .	. .	. .			. .	. .	. .	
Pedestrian		157		75	10	17		4	98	37	398
		39.4%		18.8%	2.5%	4.3%		1.0%	24.6%	9.3%	100.0%
Rate/100,000 +		0.9		0.4	0.1	0.1		< .1	0.6	0.2	
% change 88/90		3.3%		13.6%	. .	. .		. .	- 50.3%	. .	
Unspecified / other	1	13		6	1	3	1		8	8	41
	2.4%	31.7%		14.6%	2.4%	7.3%	2.4%		19.5%	19.5%	100.0%
Rate/100,000 +	< .1	0.1		< .1	< .1	< .1	< .1		< .1	< .1	
% change 88/90	. .	. .		. .	. .	. .	. .		. .	. .	
Total	30	744	1	488	68	68	3	19	456	287	2164
	1.4%	34.4%	0.0%	22.6%	3.1%	3.1%	.1%	.9%	21.1%	13.3%	100.0%

. . Percentage base less than 50 cases for 1988
+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.
* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.
** Source data: FORS Fatality File 1988 & 1990. See FORS publications for details.

Table 2.9 Road Fatalities and Road Injury Hospital Separations, Australia 1990, By 3 Digit ICD E-Code (Case Number, Rate/100,000 and % Change in Number Since 1988)

	Fatalities *			Hospital Separations **		
	1990			1990		
	Number	Rate per 100,000 +	% change in number 1988 - 90	Number	Rate per 100,000 +	% change in number 1988 - 90
E Code ***						
810 - MV & train	13 0.6%	0.1	. .	50 0.1%	0.3	. .
811 - Re-entrant coll.	2 0.1%	< .1	- 97.8	106 0.3%	0.6	15.2%
812 - MV & other MV	874 40.4%	5	- 15.8%	7132 18.0%	42	- 14.5%
813 - MV & other ie pedal cycle	65 3.0%	0.4	- 3.0%	2499 6.3%	15	- 10.1%
814 - MV & pedestrian	389 18.0%	2	- 22.2%	4310 10.9%	25	- 11.9%
815 - Other MV accident on hwy.	632 29.2%	4	- 17.2%	2256 5.7%	13	- 19.9%
816 - Other MV accident without coll. on hwy.	159 7.3%	0.9	- 14.5%	5144 13.0%	30	- 7.1%
817 - Non coll. MV acc. while boarding/ alighting	14 0.6%	0.1	. .	382 1.0%	2	29.1%
818 - Other non-coll. MV acc.	2 0.1%	< .1	. .	2024 5.1%	12	0.3%
819 - Unspecified MV acc.	7 0.3%	< .1	. .	9923 25.0%	58	- 21.2%
826 - Pedal cycle acc.	2 0.1%	< .1	. .	5801 14.6%	34	7.1%
Unspecified	5 0.2%	< .1	. .			
Total	2164 100%	13	- 19.8%	39626 100%	232	- 11.6%

. . Percentage base less than 50 cases for 1988

+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

* Source data: FORS Fatality File 1988 & 1990. See FORS publications for details.

** Source data: State and Territory hospital morbidity data. See App. A for details.

*** There are a large number of unspecified motor vehicle accidents (E819) within the hospital morbidity data. The distribution of these cases across categories 810 to 818 would result in increases in the numbers and rates for 1990.

Table 2.10 Road Fatalities and Road Injury Separations, Australia 1990
By Abbreviated Injury Score (AIS) *
(Case Number, Rate/100,000 and % Change in Number Since 1988)

	Fatalities **		Hospital Separations ***					
	1990		1990			1990		
	Maximum AIS		Principal Diagnosis			Maximum AIS		
	Number	Rate per 100,000 +	Number	Rate per 100,000 +	% change in number 1988 - 90	Number	Rate per 100,000 +	% change in number 1988 - 90
Abbreviated Injury Scale								
Minor	2 0.1%	< .1	7276 18.4%	43	- 12.2%	6329 16.0%	37	- 9.7%
Moderate	25 1.2%	0.1	20037 50.6%	117	- 11.4%	20014 50.5%	117	- 13.0%
Serious	182 8.4%	1	5831 14.7%	34	- 8.7%	7339 18.5%	43	- 12.1%
Severe	774 35.8%	5	1298 3.3%	8	- 7.8%	1638 4.1%	10	- 8.8%
Critical	542 25.0%	3	524 1.3%	3	- 18.6%	605 1.5%	4	- 29.8%
Maximum injury	359 16.6%	2	0	0	0	0	0	. .
Unspecified	280 12.9%	2	4660 11.8%	27	- 15.3%	3701 9.3%	22	- 2.9%
Total	2164 100%	13	39626 100.0%	232	- 11.6%	39626 100%	232	- 11.6%

+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

** Percentage change not calculated for the fatalities due to changes in FORS AIS coding procedures between 1988 and 1990.

** Source data: FORS Fatality File 1988 & 1990. See FORS publications for details.

*** Source data: State and Territory hospital morbidity data. See App. A for details.

Table 2.11 Road Fatalities and Road Injury Hospital Separations, Australia 1990
By Injury Severity Score (ISS) (Case Number, Rate/100,000 and % Change in Number Since 1988)

	Fatalities *		Hospital Separations **		
	1990		1990		
	Number	Rate per 100,000 +	Number	Rate per 100,000 +	% change in number 1988 - 90
ISS					
0 - 4	3 0.1%	< .1	20626 52.1%	121	- 2.0%
5 - 9	26 1.2%	0.2	10112 25.5%	59	- 20.0%
10 - 14	60 2.8%	0.4	2748 6.9%	16	- 13.7%
15 - 19	115 5.3%	0.7	1506 3.8%	9	- 10.1%
20 - 24	183 8.5%	1	623 1.6%	4	- 13.4%
25 - 29	313 14.5%	2	630 1.6%	4	- 27.0%
30 - 34	195 9.0%	1	177 0.4%	1	- 21.3%
35 - 39	190 8.8%	1	101 0.3%	0.6	42.3%
40 - 44	185 8.5%	1	48 0.1%	0.3	- 17.2%
45 - 64	237 11.0%	1	18 0.0%	0.1	. .
65 - 74	16 0.7%	0.1	1 0.0%	< .1	. .
75	361 16.7%	2	0	0	. .
Unspecified	280 12.9%	2	3036 7.7%	18	- 29.6%
Total	2164 100%	13	39626 100%	232	- 11.6%

. . Percentage base less than 50 cases for 1988.

+ The denominator for rate calculation is the estimated resident population for 1990, based on the 1991 Census. See Appendix A.

* Percentage change not calculated for the fatalities due to changes in AIS coding between 1988 and 1990.

* Source data: FORS Fatality File 1988 & 1990. See FORS publications for details.

** Source data: State and Territory hospital morbidity data. See App. A for details.

Figure 2.1 Road Injury Hospital Separations, Australia 1990
By Age Group (Case numbers. N = 39626)

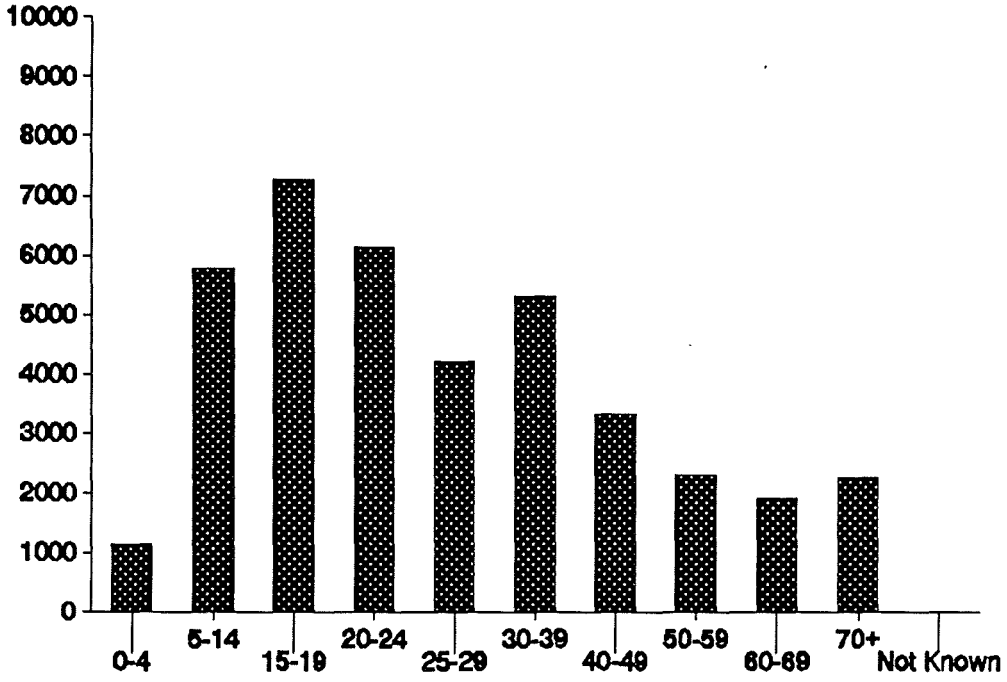


Figure 2.2 Road Fatalities, Australia 1990
By Age Group (Case numbers. N = 2164)

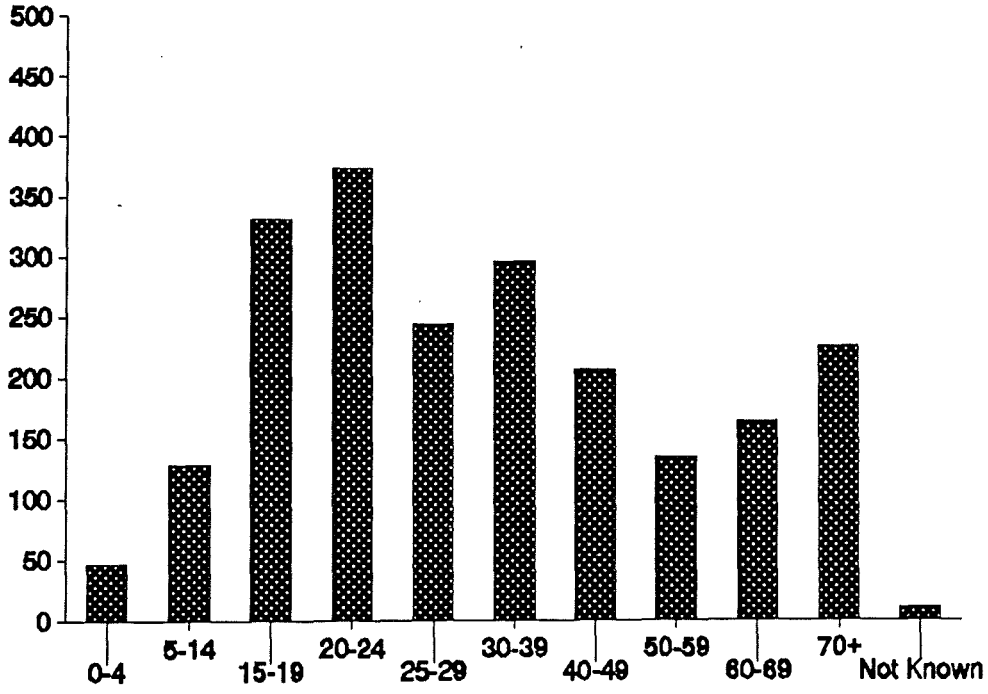


Figure 2.3 Road Injury Hospital Separations, Australia 1990
By Road User Type (Case numbers. N = 39626)

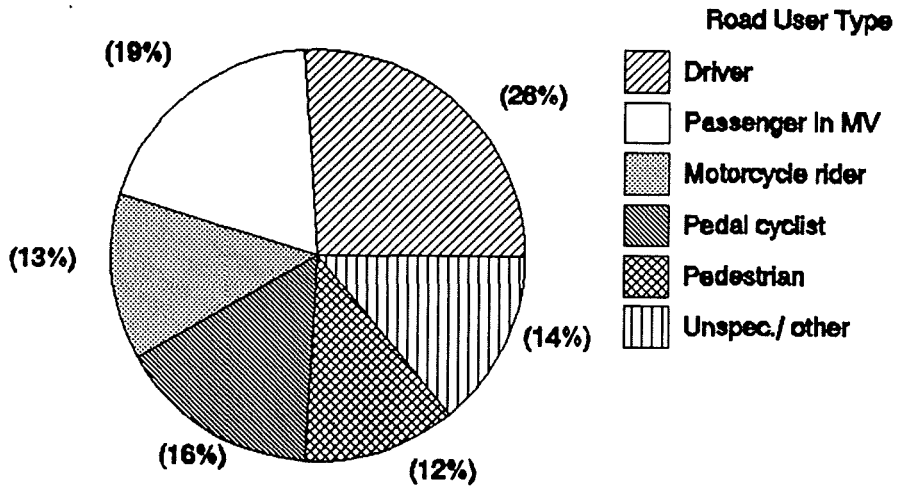


Figure 2.4 Road Fatalities, Australia 1990
By Road User Type (Case numbers. N = 2164)

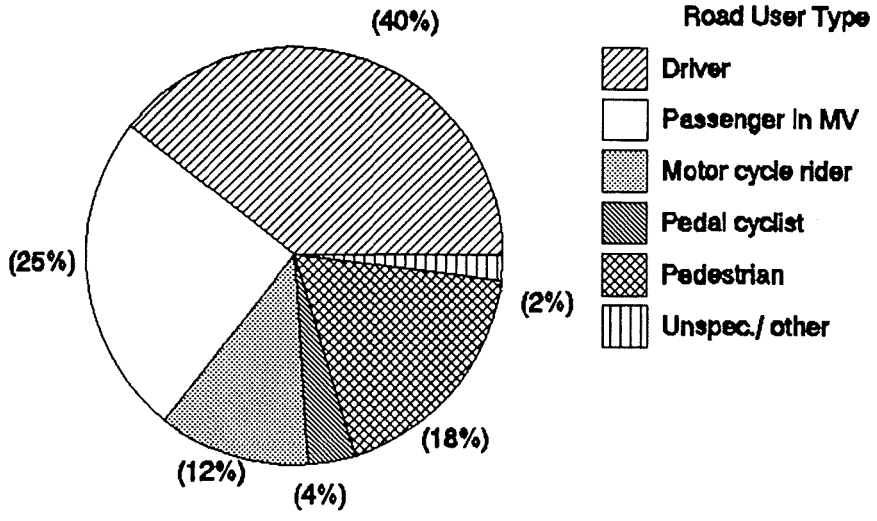


Figure 2.5 Road Injury Hospital Separations, Australia 1990
By Body Region of the Principal Diagnosis (Case numbers. N = 39626)

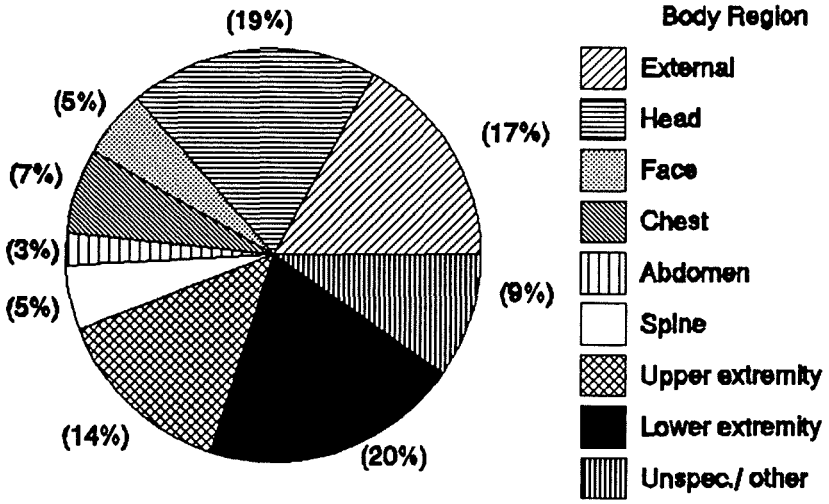


Figure 2.6 Road Injury Hospital Separations, Australia 1990
By Body Region in Which The Most Severe Injury Was Sustained (Case nos. N = 39626)

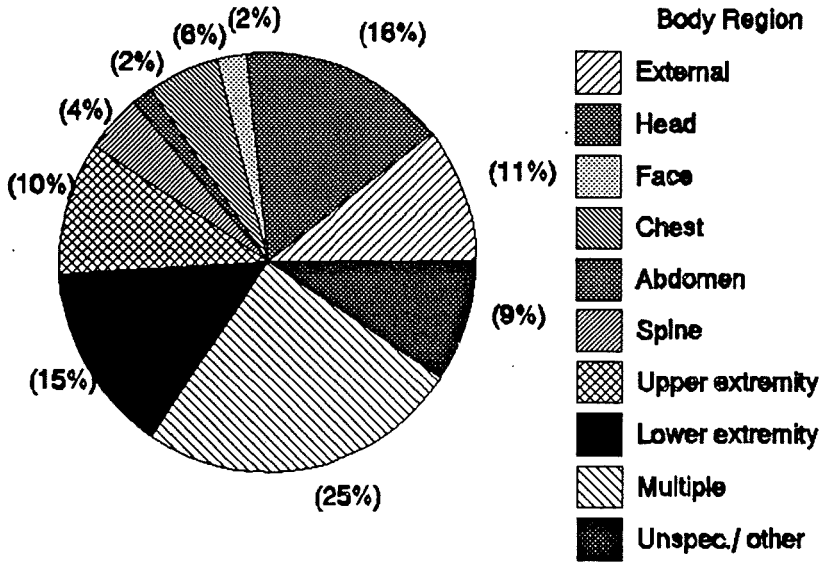


Figure 2.7 Road Injury Hospital Separations, Australia 1990
By Body Region of all Diagnoses (Case numbers. N = 39626)

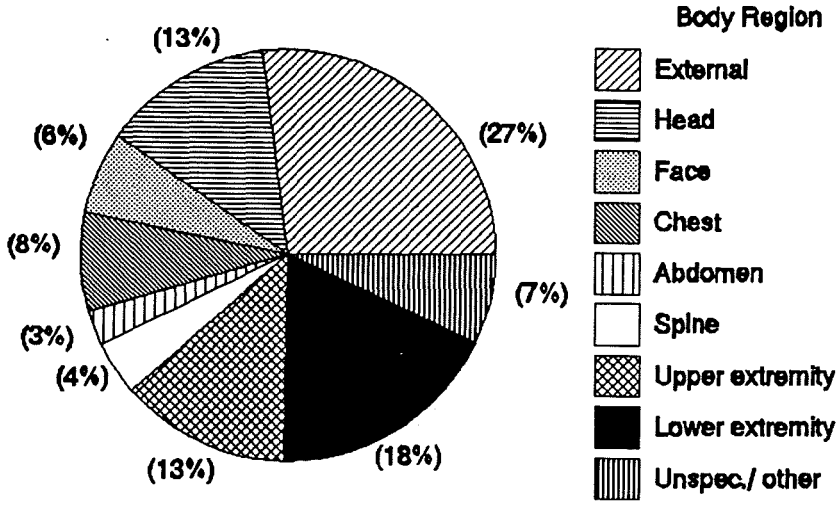


Figure 2.8 Road Injury Hospital Separations, Australia 1990
By Road User Type and Body Region of Principal Diagnosis (Case nos. N = 39626)

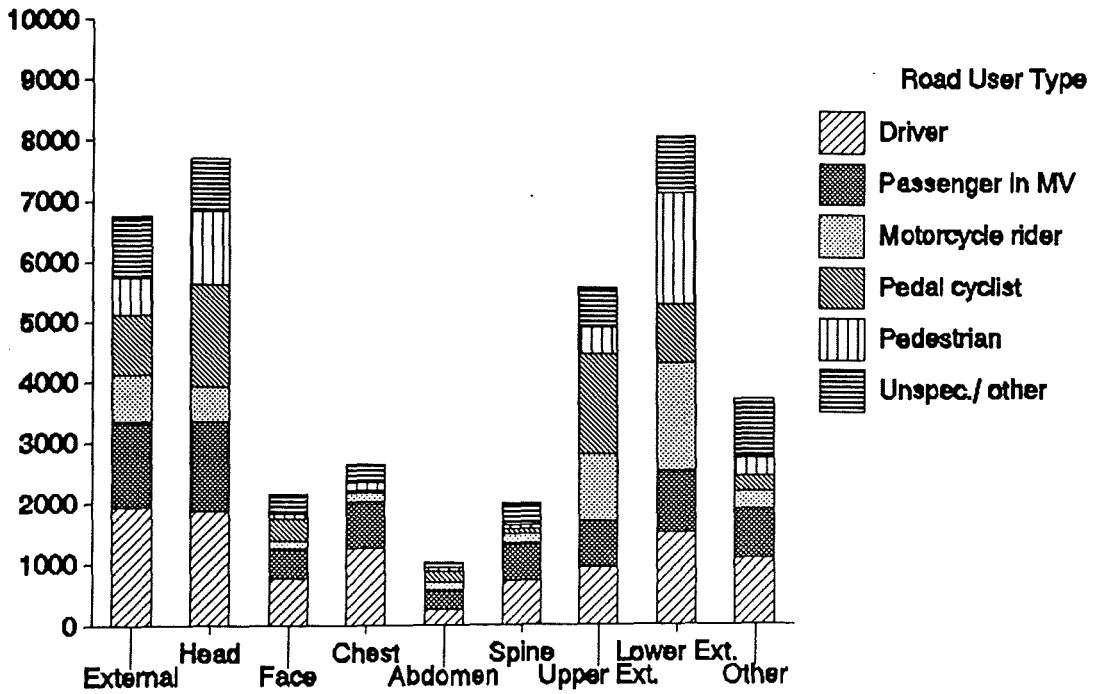


Figure 2.9 Road Injury Hospital Separations, Australia 1990, by Road User Type And Body Region in Which the Most Severe Injury Was Sustained (Case nos. N = 39626)

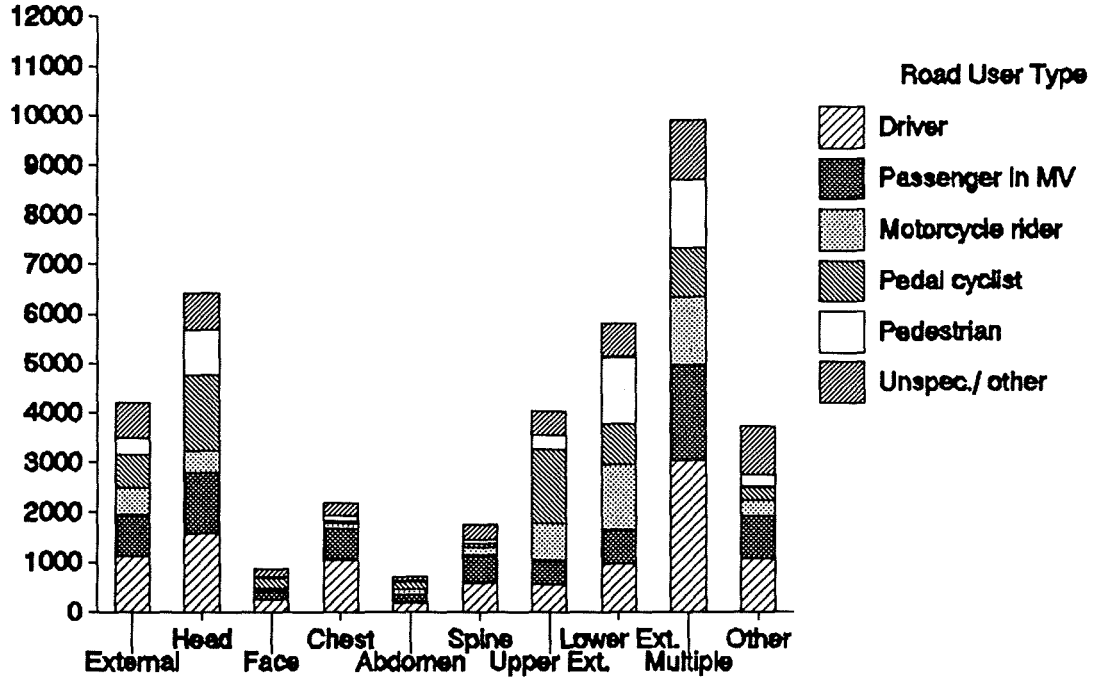


Figure 2.10 Road Fatalities, Australia 1990 by Road User Type And Body Region in Which the Most Severe Injury Was Sustained (Case nos. N = 2164)

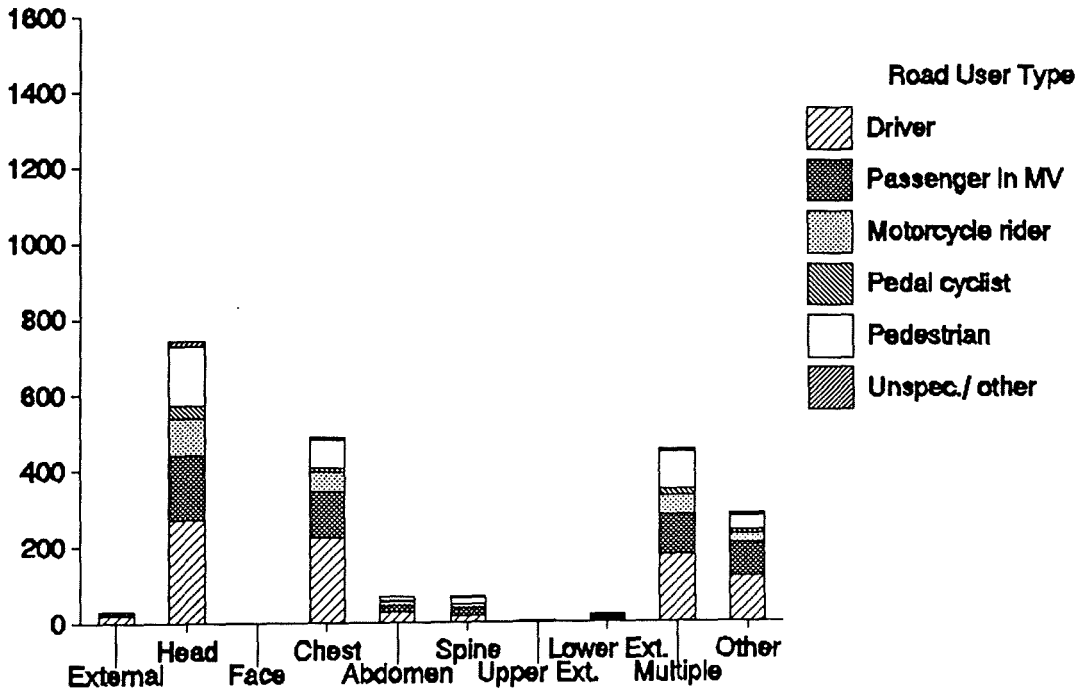


Figure 2.11 Road Injury Hospital Separations, Australia 1990
By Road User Type and Age Group (Case numbers. N = 39626)

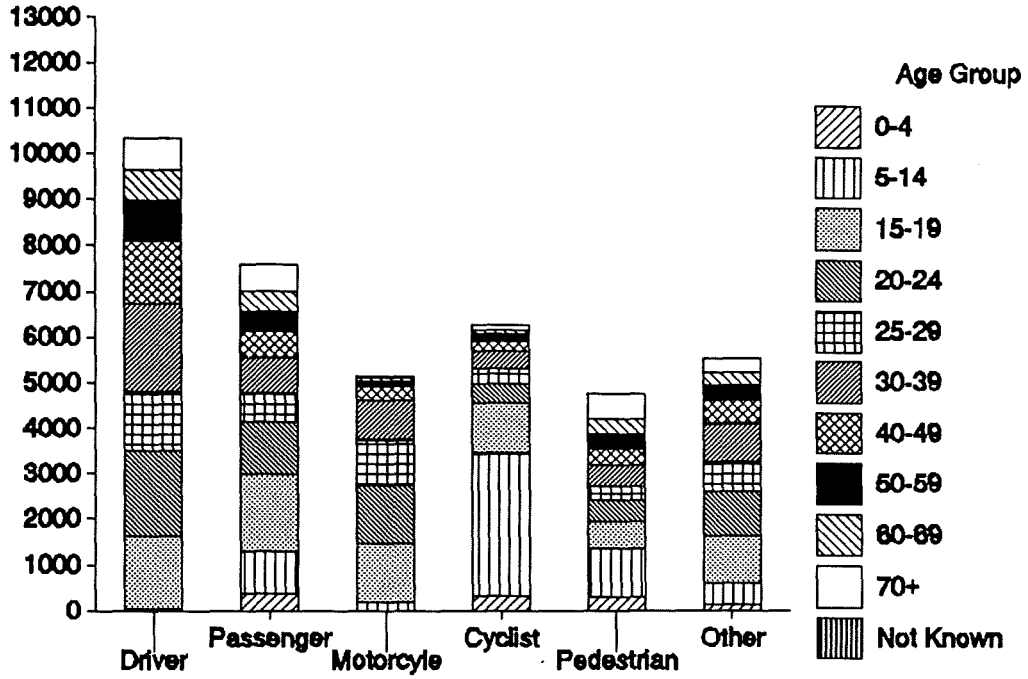


Figure 2.12 Road Fatalities, Australia 1990
By Road User Type and Age Group (Case Numbers. N = 2164)

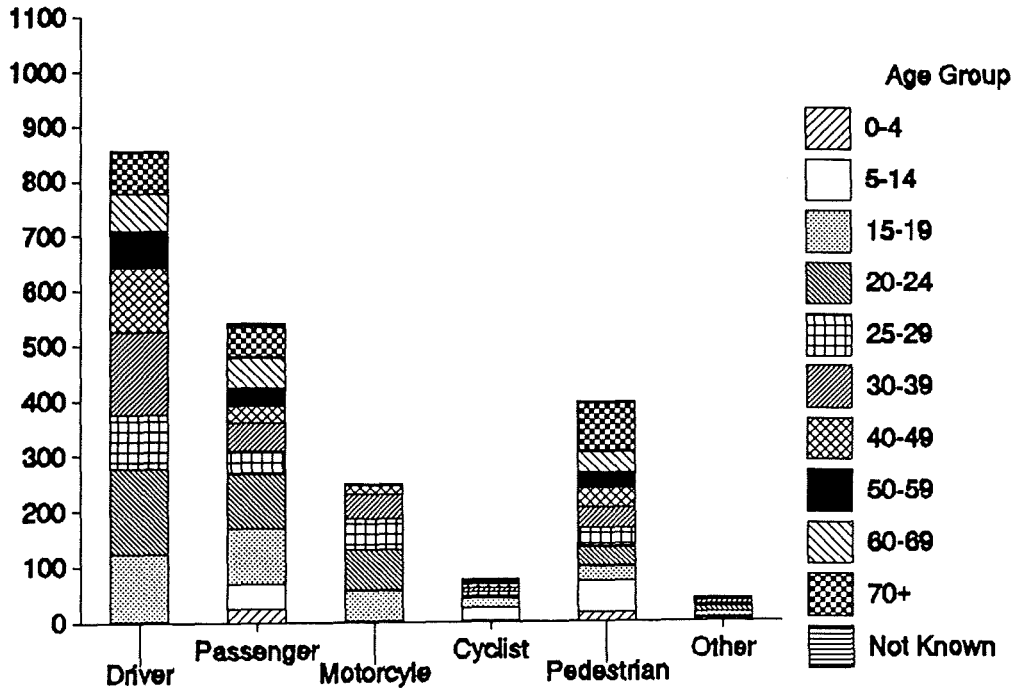


Figure 2.13 Road Injury Hospital Bed Occupancy, Australia 1990
By Road User Type (Bed days. N = 317369)

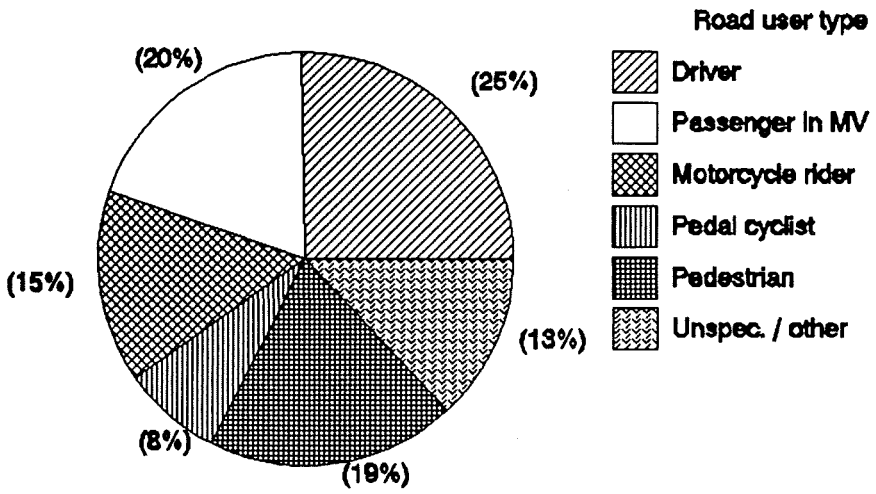


Figure 2.14 Road Injury Hospital Bed Occupancy, Australia 1990
By Body Region of Principal Diagnosis (Bed Days. N = 317369)

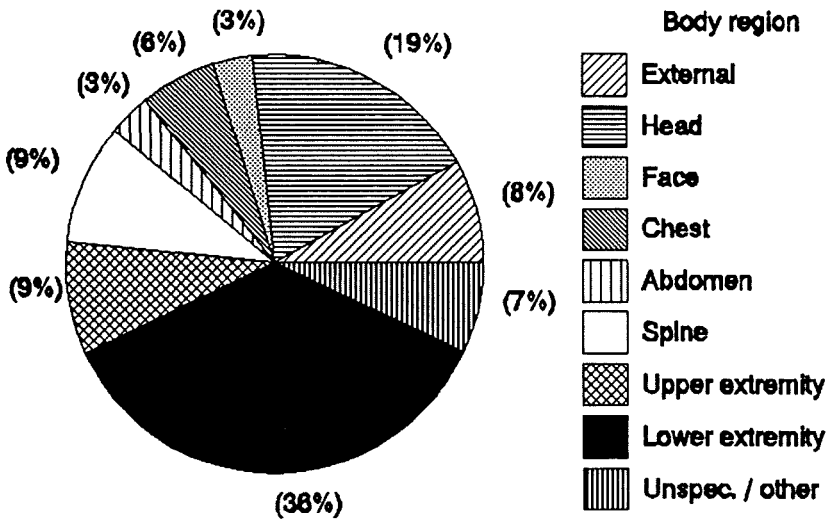


Figure 2.15 Road Injury Hospital Bed Occupancy, Australia 1990, Total Bed Days
By Body Region in Which the Most Severe Injury Was Sustained (Case nos. N = 317369 bed days)

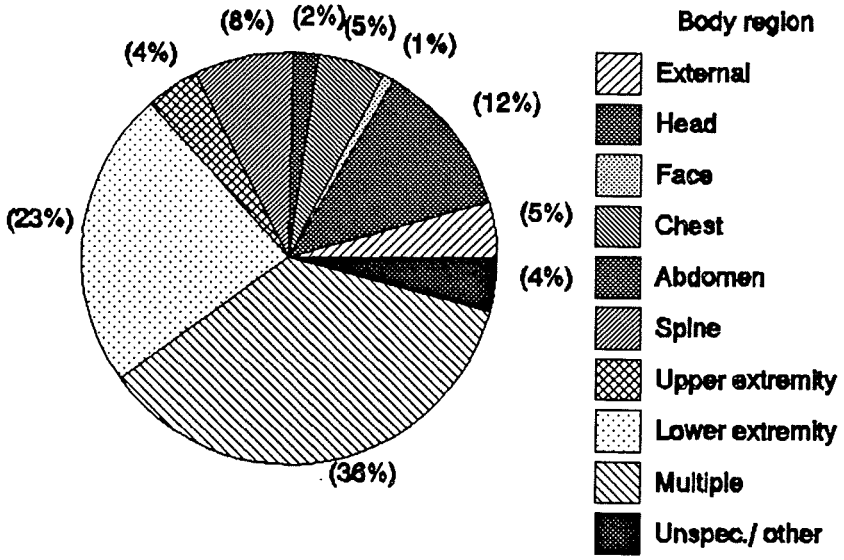


Figure 2.16 Road Injury Hospital Separations, Australia 1990
Mean Length of Stay by Road User Type (Bed Days)

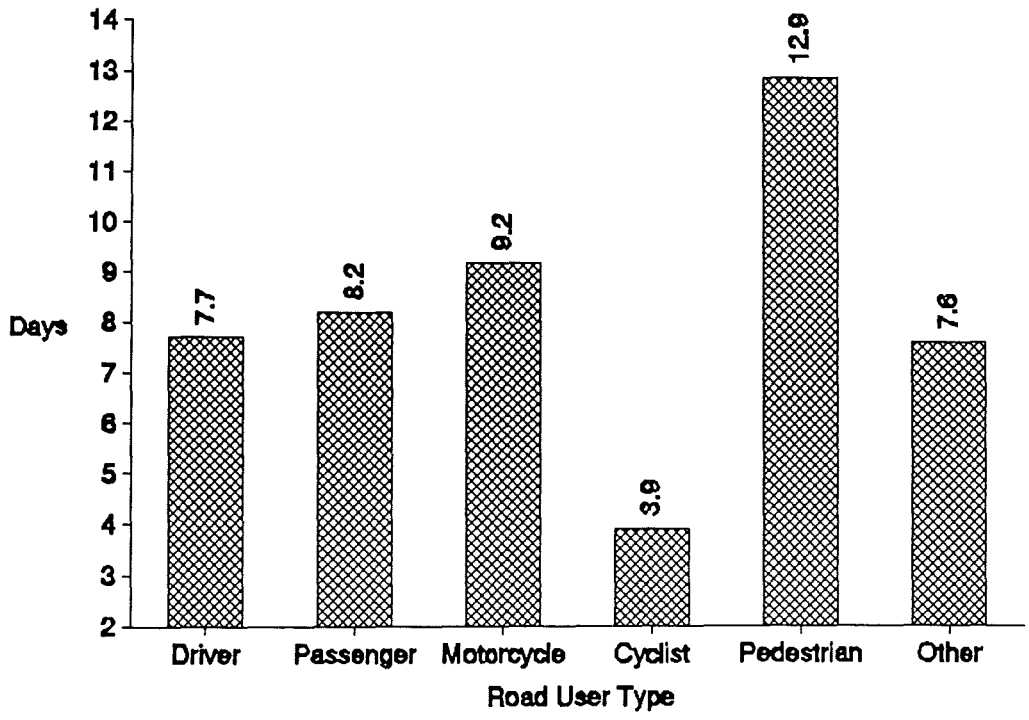


Figure 2.17 Road Injury Hospital Separations, Australia 1990
Mean Length of Stay by Body Region of Principal Diagnosis (Bed Days)

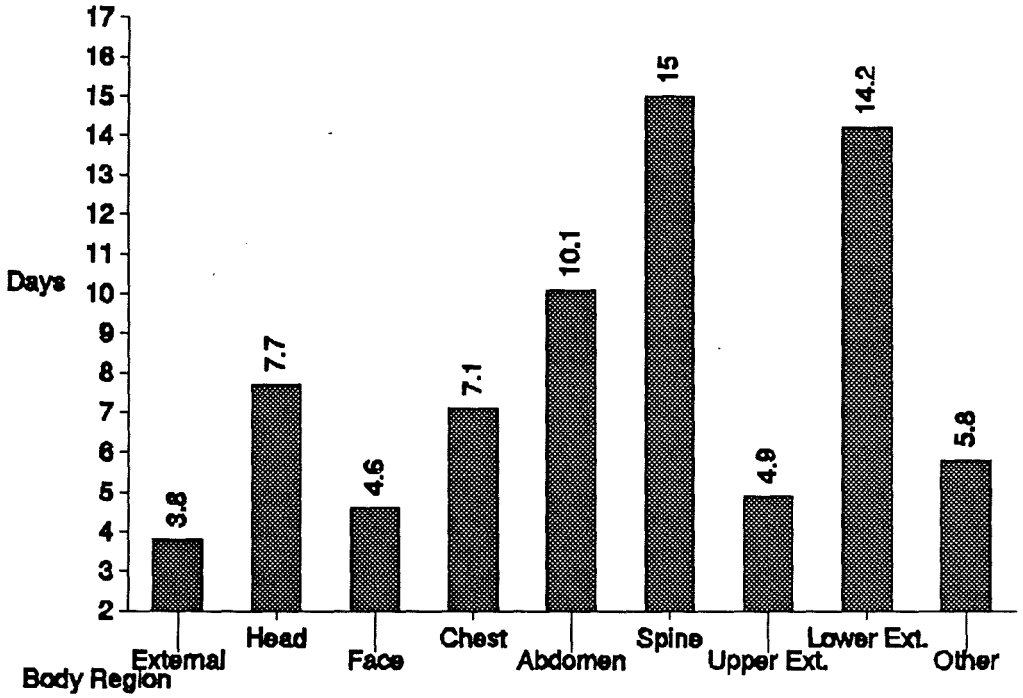
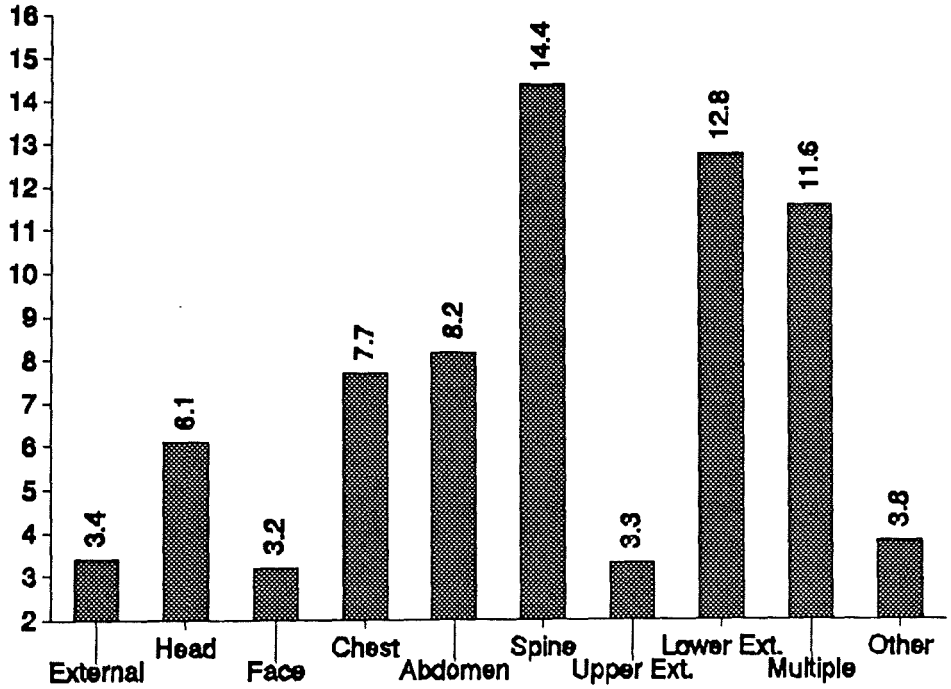


Figure 2.18 Road Injury Hospital Separations, Australia 1990, Mean Length of Stay
By Body Region in Which the Most Severe Injury Was Sustained (Case nos. N = 39626)



3. FATALITIES

The tables presented in this section provide national level counts of road fatalities for the year 1990. The data base for the tabulations was the Federal Office of Road Safety (FORS) Fatality File for the year 1990.

The official figure for road traffic deaths in Australia for 1990, from the Federal Office of Road Safety, is 2,331. The base for the fatality tables presented in Sections 2 and 3 of this report is 2,164. The figure excludes a small number of cases which do not fit the formal definitions for inclusion in the FORS Fatality File (n = 13) and a larger number of non-trauma deaths in road traffic crashes (n = 154).

All tables and figures should be read in conjunction with the information provided in Appendix A, the glossary of terms and the documentation distributed by the Federal Office of Road Safety.

Table 3.1 Road Fatalities, Australia 1990, By Age Group and Road User Type (Case Numbers and Row Percentages)

	Road user type						Total
	Driver	Passenger in motor vehicle	Motor cycle rider	Pedal cyclist	Pedestrian	Unspec./ other	
Age group							
0 - 4 yrs		25		2	16	4	47
		53.2%		4.3%	34.0%	8.5%	100.0%
5 - 14 yrs	1	44	2	23	56	2	128
	.8%	34.4%	1.6%	18.0%	43.8%	1.6%	100.0%
15 - 19 yrs	122	102	55	16	27	10	332
	36.7%	30.7%	16.6%	4.8%	8.1%	3.0%	100.0%
20 - 24 yrs	154	97	73	6	35	9	374
	41.2%	25.9%	19.5%	1.6%	9.4%	2.4%	100.0%
25 - 29 yrs	98	42	57	7	34	6	244
	40.2%	17.2%	23.4%	2.9%	13.9%	2.5%	100.0%
30 - 39 yrs	150	52	44	7	38	5	296
	50.7%	17.6%	14.9%	2.4%	12.8%	1.7%	100.0%
40 - 49 yrs	117	30	16	6	34	4	207
	56.5%	14.5%	7.7%	2.9%	16.4%	1.9%	100.0%
50 - 59 yrs	69	33	1	4	28		135
	51.1%	24.4%	.7%	3.0%	20.7%		100.0%
60 - 69 yrs	67	55	2	4	37		165
	40.6%	33.3%	1.2%	2.4%	22.4%		100.0%
70 or more years	75	57		2	91	1	226
	33.2%	25.2%		.9%	40.3%	.4%	100.0%
Not known	2	5	1		2		10
	20.0%	50.0%	10.0%		20.0%		100.0%
Total	855	542	251	77	398	41	2164
	39.5%	25.0%	11.6%	3.6%	18.4%	1.9%	100.0%

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.2 Road Fatalities, Australia 1990 By Age Group and Body Region In Which The Most Severe Injury Was Sustained (Case Numbers and Row Percentages)

	Body region of most severe injury *										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Multiple	Unspec./ other	
Age group											
0 - 4 yrs	1	25		1	1	4		1	9	5	47
	3.3%	3.4%		.2%	1.5%	5.9%		5.3%	2.0%	1.7%	2.2%
5 - 14 yrs		49		10	4	8		1	35	21	128
		6.6%		2.0%	5.9%	11.8%		5.3%	7.7%	7.3%	5.9%
15 - 19 yrs	3	126		55	20	10	2	2	71	43	332
	10.0%	16.9%		11.3%	29.4%	14.7%	66.7%	10.5%	15.6%	15.0%	15.3%
20 - 24 yrs	4	161		74	7	17		5	66	40	374
	13.3%	21.6%		15.2%	10.3%	25.0%		26.3%	14.5%	13.9%	17.3%
25 - 29 yrs	1	93		57	10	6	1	3	46	27	244
	3.3%	12.5%		11.7%	14.7%	8.8%	33.3%	15.8%	10.1%	9.4%	11.3%
30 - 39 yrs	11	108		59	7	6		1	68	36	296
	36.7%	14.5%		12.1%	10.3%	8.8%		5.3%	14.9%	12.5%	13.7%
40 - 49 yrs		63	1	49	7	5		2	51	29	207
		8.5%	100.0%	10.0%	10.3%	7.4%		10.5%	11.2%	10.1%	9.6%
50 - 59 yrs	5	27		44	2	1		2	33	21	135
	16.7%	3.6%		9.0%	2.9%	1.5%		10.5%	7.2%	7.3%	6.2%
60 - 69 yrs	2	40		55	6	4			32	26	165
	6.7%	5.4%		11.3%	8.8%	5.9%			7.0%	9.1%	7.6%
70 or more years	3	51		82	4	7		2	44	33	226
	10.0%	6.9%		16.8%	5.9%	10.3%		10.5%	9.6%	11.5%	10.4%
Not known		1		2					1	6	10
		.1%		.4%					.2%	2.1%	.5%
Total	30	744	1	488	68	68	3	19	456	287	2164
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.3 Road Fatalities, Australia 1990, By Road User Type and Body Region In Which The Most Severe Injury Was Sustained (Case Numbers and Row Percentages)

	Body region of most severe injury *										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Multiple	Unspec./ other	
Road user type											
Driver	19	271		224	28	17		3	175	118	855
	63.3%	36.4%		45.9%	41.2%	25.0%		15.8%	38.4%	41.1%	39.5%
Passenger in motor vehicle	10	170		121	17	21	1	7	107	88	542
	33.3%	22.8%		24.8%	25.0%	30.9%	33.3%	36.8%	23.5%	30.7%	25.0%
Motor cycle rider		99		51	10	10	1	3	52	25	251
		13.3%		10.5%	14.7%	14.7%	33.3%	15.8%	11.4%	8.7%	11.6%
Pedal cyclist		34	1	11	2			2	16	11	77
		4.6%	100.0%	2.3%	2.9%			10.5%	3.5%	3.8%	3.6%
Pedestrian		157		75	10	17		4	98	37	398
		21.1%		15.4%	14.7%	25.0%		21.1%	21.5%	12.9%	18.4%
Unspecified / other	1	13		6	1	3	1		8	8	41
	3.3%	1.7%		1.2%	1.5%	4.4%	33.3%		1.8%	2.8%	1.9%
Total	30	744	1	488	68	68	3	19	456	287	2164
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.4 Road Fatalities, Australia 1990, By Age Group and Body Region
In Which The Most Severe Injury Was Sustained (Case Numbers and Row Percentages) . Cases Selected for Maximum AIS From 1 to 3.

	Body region of most severe injury *											Total
	External	Head	Face	Neck	Chest	Abdomen	Spine	Upper extrem.	Lower extrem.	Multiple	Unspec. other	
MAX AIS 1 - 3 **												
0 - 4 yrs	1 20.0%	1 20.0%					1 20.0%		1 20.0%	1 20.0%		5 100.0%
5 - 14 yrs		4 26.7%			2 13.3%				1 6.7%	8 53.3%		15 100.0%
15 - 19 yrs		1 4.0%			4 16.0%		1 4.0%	2 8.0%	2 8.0%	15 60.0%		25 100.0%
20 - 24 yrs		9 27.3%			3 9.1%		1 3.0%		5 15.2%	15 45.5%		33 100.0%
25 - 29 yrs		6 23.1%			2 7.7%			1 3.8%	1 3.8%	16 61.5%		26 100.0%
30 - 39 yrs	1 4.0%	8 32.0%			2 8.0%	1 4.0%				13 52.0%		25 100.0%
40 - 49 yrs		2 9.1%	1 4.5%		5 22.7%	1 4.5%			1 4.5%	12 54.5%		22 100.0%
50 - 59 yrs		1 6.7%			2 13.3%		1 6.7%		2 13.3%	9 60.0%		15 100.0%
60 - 69 yrs					3 25.0%	2 16.7%				7 58.3%		12 100.0%
70 or more years		3 10.0%			9 30.0%		2 6.7%		1 3.3%	15 50.0%		30 100.0%
Not known										1 100.0%		1 100.0%
Total	2 1.0%	35 16.7%	1 .5%		32 15.3%	4 1.9%	6 2.9%	3 1.4%	14 6.7%	112 53.6%		209 100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.5 Road Fatalities, Australia 1990, By Age Group and Body Region
In Which The Most Severe Injury Was Sustained (Case Numbers and Row Percentages) . Cases Selected for Maximum AIS From 4 to 6.

	Body region of most severe injury *											Total
	External	Head	Face	Neck	Chest	Abdomen	Spine	Upper extrem.	Lower extrem.	Multiple	Unspec. other	
MAX AIS 4 - 6 **												
0 - 4 yrs		24			1	1	3			8		37
		64.9%			2.7%	2.7%	8.1%			21.6%		100.0%
5 - 14 yrs		45			8	4	8			27		92
		48.9%			8.7%	4.3%	8.7%			29.3%		100.0%
15 - 19 yrs	3	125			51	20	9			56		264
	1.1%	47.3%			19.3%	7.6%	3.4%			21.2%		100.0%
20 - 24 yrs	4	152			71	7	16			51		301
	1.3%	50.5%			23.6%	2.3%	5.3%			16.9%		100.0%
25 - 29 yrs	1	87		3	55	10	6		2	30		194
	.5%	44.8%		1.5%	28.4%	5.2%	3.1%		1.0%	15.5%		100.0%
30 - 39 yrs	10	100		1	57	6	6		1	55		236
	4.2%	42.4%		.4%	24.2%	2.5%	2.5%		.4%	23.3%		100.0%
40 - 49 yrs		61		2	44	6	5		1	39		158
		38.6%		1.3%	27.8%	3.8%	3.2%		.6%	24.7%		100.0%
50 - 59 yrs	5	26			42	2				24		99
	5.1%	26.3%			42.4%	2.0%				24.2%		100.0%
60 - 69 yrs	2	40		1	52	4	4			25		128
	1.6%	31.3%		.8%	40.6%	3.1%	3.1%			19.5%		100.0%
70 or more years	3	48			73	4	5		1	29		163
	1.8%	29.4%			44.8%	2.5%	3.1%		.6%	17.8%		100.0%
Not known		1			2							3
		33.3%			66.7%							100.0%
Total	28	709		7	456	64	62		5	344		1675
	1.7%	42.3%		.4%	27.2%	3.8%	3.7%		.3%	20.5%		100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.6 Road Fatalities, Australia 1990, By Road User Type and Body Region
In Which The Most Severe Injury Was Sustained (Case Numbers and Row Percentages) . Cases Selected for Maximum AIS From 1 to 3.

	Body region of most severe injury *											Total
	External	Head	Face	Neck	Chest	Abdomen	Spine	Upper extrem.	Lower extrem.	Multiple	Unspec. / other	
MAX AIS 1 - 3 **												
Driver	1 1.2%	13 15.5%			18 21.4%	2 2.4%	1 1.2%		2 2.4%	47 56.0%		84 100.0%
Passenger in motor vehicle	1 2.0%	6 11.8%			4 7.8%	1 2.0%	3 5.9%	1 2.0%	7 13.7%	28 54.9%		51 100.0%
Motor cycle rider		7 25.9%			3 11.1%		1 3.7%	1 3.7%	2 7.4%	13 48.1%		27 100.0%
Pedal cyclist		2 25.0%	1 12.5%							5 62.5%		8 100.0%
Pedestrian		6 17.6%			6 17.6%	1 2.9%			3 8.8%	18 52.9%		34 100.0%
Unspecified / other		1 20.0%			1 20.0%		1 20.0%	1 20.0%		1 20.0%		5 100.0%
Total	2 1.0%	35 16.7%	1 .5%		32 15.3%	4 1.9%	6 2.9%	3 1.4%	14 6.7%	112 53.6%		209 100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.7 Road Fatalities, Australia 1990, By Road User Type and Body Region
In Which The Most Severe Injury Was Sustained (Case Numbers and Row Percentages) . Cases Selected for Maximum AIS From 4 to 6.

	Body region of most severe injury *										Total
	External	Head	Face	Neck	Chest	Abdomen	Spine	Upper extrem.	Lower extrem.	Multiple	Unspec. / other	
MAX AIS 4 - 6 **												
Driver	18	258		3	206	26	16		1	128		656
	2.7%	39.3%		.5%	31.4%	4.0%	2.4%		.2%	19.5%		100.0%
Passenger in motor vehicle	9	164		1	117	16	18			79		404
	2.2%	40.6%		.2%	29.0%	4.0%	4.5%			19.6%		100.0%
Motor cycle rider		92		3	48	10	9		1	39		202
		45.5%		1.5%	23.8%	5.0%	4.5%		.5%	19.3%		100.0%
Pedal cyclist		32			11	2			2	11		58
		55.2%			19.0%	3.4%			3.4%	19.0%		100.0%
Pedestrian		151			69	9	17		1	80		327
		46.2%			21.1%	2.8%	5.2%		.3%	24.5%		100.0%
Unspecified / other	1	12			5	1	2			7		28
	3.6%	42.9%			17.9%	3.6%	7.1%			25.0%		100.0%
Total	28	709		7	456	64	62		5	344		1675
	1.7%	42.3%		.4%	27.2%	3.8%	3.7%		.3%	20.5%		100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.8 Road Fatalities, Australia 1990, By Body Region in Which Most Severe Injury Was Sustained and Maximum AIS Score (Case Numbers and Row Percentages)

	Maximum AIS Score *							Total
	Minor	Moderate	Serious	Severe	Critical	Maximum injury	Unspecified / other	
Body region of most severe injury **								
External			2		3	25		30
			6.7%		10.0%	83.3%		100.0%
Head		2	33	273	223	213		744
		.3%	4.4%	36.7%	30.0%	28.6%		100.0%
Face		1						1
		100.0%						100.0%
Chest		2	30	218	167	71		488
		.4%	6.1%	44.7%	34.2%	14.5%		100.0%
Abdomen		3	1	19	44	1		68
		4.4%	1.5%	27.9%	64.7%	1.5%		100.0%
Spine		4	2		45	17		68
		5.9%	2.9%		66.2%	25.0%		100.0%
Upper extremity		1	2					3
		33.3%	66.7%					100.0%
Lower extremity		1	13	4	1			19
		5.3%	68.4%	21.1%	5.3%			100.0%
Multiple	2	11	99	260	58	26		456
	.4%	2.4%	21.7%	57.0%	12.7%	5.7%		100.0%
Unspecified / other					1	6	280	287
					.3%	2.1%	97.6%	100.0%
Total	2	25	182	774	542	359	280	2164
	.1%	1.2%	8.4%	35.8%	25.0%	16.6%	12.9%	100.0%

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

** Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category. This table shows the AIS score for the body region of maximum AIS.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.9 Road Fatalities, Australia 1990, By Road User Type, Mean Injury Severity Score (ISS) and Maximum Abbreviated Injury Score (AIS) (Case Numbers and Row Percentages)

	Mean ISS score	Maximum AIS *							Total
		Minor	Moderate	Serious	Severe	Critical	Maximum injury	Unspec. / other	
Road user type									
Driver	41.3	1 .1%	7 .8%	76 8.9%	302 35.3%	199 23.3%	155 18.1%	115 13.5%	855 100.0%
Passenger in motor vehicle	40.8		8 1.5%	43 7.9%	182 33.6%	131 24.2%	91 16.8%	87 16.1%	542 100.0%
Motor cycle rider	40.3		3 1.2%	24 9.6%	90 35.9%	70 27.9%	42 16.7%	22 8.8%	251 100.0%
Pedal cyclist	35.1		1 1.3%	7 9.1%	30 39.0%	19 24.7%	9 11.7%	11 14.3%	77 100.0%
Pedestrian	39.7	1 .3%	4 1.0%	29 7.3%	162 40.7%	116 29.1%	49 12.3%	37 9.3%	398 100.0%
Unspecified / other	47.9		2 4.9%	3 7.3%	8 19.5%	7 17.1%	13 31.7%	8 19.5%	41 100.0%
Total	40.7	2 .1%	25 1.2%	182 8.4%	774 35.8%	542 25.0%	359 16.6%	280 12.9%	2164 100.0%

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.10 Road Fatalities, Australia 1990, By Road User Type, Body Region of Most Severe Injury * and Maximum Abbreviated Injury Scale (AIS) (Case Numbers and Row Percentages)

	Maximum AIS **							Total
	Minor	Moderate	Serious	Severe	Critical	Maximum injury	Unspec./ other	
Road user type								
Driver								
External			1		3	15		19
			5.3%		15.8%	78.9%		100.0%
Head		1	12	103	64	91		271
		.4%	4.4%	38.0%	23.6%	33.6%		100.0%
Chest		1	17	90	84	32		224
		.4%	7.6%	40.2%	37.5%	14.3%		100.0%
Abdomen		1	1	10	16			28
		3.6%	3.6%	35.7%	57.1%			100.0%
Spine		1			11	5		17
		5.9%			64.7%	29.4%		100.0%
Lower extremity			2	1				3
			66.7%	33.3%				100.0%
Multiple	1	3	43	98	21	9		175
	.6%	1.7%	24.6%	56.0%	12.0%	5.1%		100.0%
Unspecified / other						3	115	118
						2.5%	97.5%	100.0%
Total	1	7	76	302	199	155	115	855
	.1%	.8%	8.9%	35.3%	23.3%	18.1%	13.5%	100.0%
Passenger in motor vehicle								
External			1			9		10
			10.0%			90.0%		100.0%
Head			6	59	50	55		170
			3.5%	34.7%	29.4%	32.4%		100.0%
Chest			4	60	39	18		121
			3.3%	49.6%	32.2%	14.9%		100.0%
Abdomen		1		3	13			17
		5.9%		17.6%	76.5%			100.0%
Spine		2	1		16	2		21
		9.5%	4.8%		76.2%	9.5%		100.0%
Upper extremity			1					1
			100.0%					100.0%
Lower extremity			7					7
			100.0%					100.0%
Multiple		5	23	60	13	6		107
		4.7%	21.5%	56.1%	12.1%	5.6%		100.0%
Unspecified / other						1	87	88
						1.1%	98.9%	100.0%
Total		8	43	182	131	91	87	542
		1.5%	7.9%	33.6%	24.2%	16.8%	16.1%	100.0%

(continued)

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.10 Road Fatalities, Australia 1990, By Road User Type, Body Region of Most Severe Injury * and Maximum Abbreviated Injury Scale (AIS) (Case Numbers and Row Percentages)

	Maximum AIS **							Total
	Minor	Moderate	Serious	Severe	Critical	Maximum injury	Unspec./ other	
Motor cycle rider								
Head			7 7.1%	32 32.3%	38 38.4%	22 22.2%		99 100.0%
Chest			3 5.9%	27 52.9%	10 19.6%	11 21.6%		51 100.0%
Abdomen				1 10.0%	8 80.0%	1 10.0%		10 100.0%
Spine			1 10.0%		7 70.0%	2 20.0%		10 100.0%
Upper extremity		1 100.0%						1 100.0%
Lower extremity			2 66.7%	1 33.3%				3 100.0%
Multiple		2 3.8%	11 21.2%	29 55.8%	6 11.5%	4 7.7%		52 100.0%
Unspecified / other					1 4.0%	2 8.0%	22 88.0%	25 100.0%
Total		3 1.2%	24 9.6%	90 35.9%	70 27.9%	42 16.7%	22 8.8%	251 100.0%
Pedal cyclist								
Head			2 5.9%	11 32.4%	14 41.2%	7 20.6%		34 100.0%
Face		1 100.0%						1 100.0%
Chest				8 72.7%	3 27.3%			11 100.0%
Abdomen				2 100.0%				2 100.0%
Lower extremity				1 50.0%	1 50.0%			2 100.0%
Multiple			5 31.3%	8 50.0%	1 6.3%	2 12.5%		16 100.0%
Unspecified / other							11 100.0%	11 100.0%
Total		1 1.3%	7 9.1%	30 39.0%	19 24.7%	9 11.7%	11 14.3%	77 100.0%

(continued)

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.10 Road Fatalities, Australia 1990, By Road User Type, Body Region of Most Severe Injury * and Maximum Abbreviated Injury Scale (AIS) (Case Numbers and Row Percentages)

	Maximum AIS **							Total
	Minor	Moderate	Serious	Severe	Critical	Maximum injury	Unspec./ other	
Pedestrian								
Head			6 3.8%	65 41.4%	54 34.4%	32 20.4%		157 100.0%
Chest		1 1.3%	5 6.7%	32 42.7%	29 38.7%	8 10.7%		75 100.0%
Abdomen		1 10.0%		3 30.0%	6 60.0%			10 100.0%
Spine					11 64.7%	6 35.3%		17 100.0%
Lower extremity		1 25.0%	2 50.0%	1 25.0%				4 100.0%
Multiple	1 1.0%	1 1.0%	16 16.3%	61 62.2%	16 16.3%	3 3.1%		98 100.0%
Unspecified / other							37 100.0%	37 100.0%
Total	1 .3%	4 1.0%	29 7.3%	162 40.7%	116 29.1%	49 12.3%	37 9.3%	398 100.0%
Unspecified / other								
External						1 100.0%		1 100.0%
Head		1 7.7%		3 23.1%	3 23.1%	6 46.2%		13 100.0%
Chest			1 16.7%	1 16.7%	2 33.3%	2 33.3%		6 100.0%
Abdomen					1 100.0%			1 100.0%
Spine		1 33.3%				2 66.7%		3 100.0%
Upper extremity			1 100.0%					1 100.0%
Multiple			1 12.5%	4 50.0%	1 12.5%	2 25.0%		8 100.0%
Unspecified / other							8 100.0%	8 100.0%
Total		2 4.9%	3 7.3%	8 19.5%	7 17.1%	13 31.7%	8 19.5%	41 100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.11 Road Fatalities, Australia 1990, By Road User Type and Timing of Death (Case Numbers and Row Percentages)

	Timing of death							Total
	Instan-taneous	Died at scene before med. / amb. assist	Died at scene during med. / amb. assist.	Died in transit to hosp.	Died in hosp.	Died after leaving hospital	Not known	
Road user type								
Driver	184 21.5%	399 46.7%	44 5.1%	28 3.3%	187 21.9%	1 .1%	12 1.4%	855 100.0%
Passenger in motor vehicle	111 20.5%	230 42.4%	32 5.9%	17 3.1%	148 27.3%		4 .7%	542 100.0%
Motor cycle rider	45 17.9%	107 42.6%	15 6.0%	5 2.0%	78 31.1%		1 .4%	251 100.0%
Pedal cyclist	10 13.0%	19 24.7%	2 2.6%	3 3.9%	42 54.5%		1 1.3%	77 100.0%
Pedestrian	42 10.6%	112 28.1%	20 5.0%	24 6.0%	197 49.5%	1 .3%	2 .5%	398 100.0%
Unspecified / other	10 24.4%	16 39.0%	1 2.4%	1 2.4%	12 29.3%		1 2.4%	41 100.0%
Total	402 18.6%	883 40.8%	114 5.3%	78 3.6%	664 30.7%	2 .1%	21 1.0%	2164 100.0%

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.12 Road Fatalities, Australia 1990, By Age Group and Timing of Death (Case Numbers and Row Percentages)

	Timing of death							Total
	Instan-taneous	Died at scene before med. / amb. assist	Died at scene during med. / amb. assist.	Died in transit to hosp.	Died in hosp.	Died after leaving hospital	Not known	
Age group								
0 - 4 yrs	9	20	2	2	14			47
	19.1%	42.6%	4.3%	4.3%	29.8%			100.0%
5 - 14 yrs	18	35	9	11	53		2	128
	14.1%	27.3%	7.0%	8.6%	41.4%		1.6%	100.0%
15 - 19 yrs	58	145	19	9	98		3	332
	17.5%	43.7%	5.7%	2.7%	29.5%		.9%	100.0%
20 - 24 yrs	71	170	19	14	97		3	374
	19.0%	45.5%	5.1%	3.7%	25.9%		.8%	100.0%
25 - 29 yrs	60	98	14	7	65			244
	24.6%	40.2%	5.7%	2.9%	26.6%			100.0%
30 - 39 yrs	55	143	17	9	68		4	296
	18.6%	48.3%	5.7%	3.0%	23.0%		1.4%	100.0%
40 - 49 yrs	44	83	12	4	63		1	207
	21.3%	40.1%	5.8%	1.9%	30.4%		.5%	100.0%
50 - 59 yrs	24	65	10	2	31		3	135
	17.8%	48.1%	7.4%	1.5%	23.0%		2.2%	100.0%
60 - 69 yrs	32	59	5	5	61	1	2	165
	19.4%	35.8%	3.0%	3.0%	37.0%	.6%	1.2%	100.0%
70 or more years	30	62	7	14	109	1	3	226
	13.3%	27.4%	3.1%	6.2%	48.2%	.4%	1.3%	100.0%
Not known	1	3		1	5			10
	10.0%	30.0%		10.0%	50.0%			100.0%
Total	402	883	114	78	664	2	21	2164
	18.6%	40.8%	5.3%	3.6%	30.7%	.1%	1.0%	100.0%

Source data: FORS Fatality File 1990. See FORS documentation for details.

Table 3.13 Road Fatalities, Australia 1990, By Body Region of Road User Type and Timing of Death (Case Numbers and Row Percentages)

	Timing of death							Total
	Instan-taneous	Died at scene before med. / amb. assist	Died at scene during med. / amb. assist.	Died in transit to hosp.	Died in hosp.	Died after leaving hospital	Not known	
Body region of most severe injury *								
External	20	10						30
	66.7%	33.3%						100.0%
Head	139	279	26	20	278		2	744
	18.7%	37.5%	3.5%	2.7%	37.4%		.3%	100.0%
Face		1						1
		100.0%						100.0%
Chest	85	218	41	19	121	2	2	488
	17.4%	44.7%	8.4%	3.9%	24.8%	.4%	.4%	100.0%
Abdomen	10	16	9	5	27		1	68
	14.7%	23.5%	13.2%	7.4%	39.7%		1.5%	100.0%
Spine	14	30	4	6	14			68
	20.6%	44.1%	5.9%	8.8%	20.6%			100.0%
Upper extremity		3						3
		100.0%						100.0%
Lower extremity	3	8	2		6			19
	15.8%	42.1%	10.5%		31.6%			100.0%
Multiple	84	197	19	20	135		1	456
	18.4%	43.2%	4.2%	4.4%	29.6%		.2%	100.0%
Unspecified / other	47	121	13	8	83		15	287
	16.4%	42.2%	4.5%	2.8%	28.9%		5.2%	100.0%
Total	402	883	114	78	664	2	21	2164
	18.6%	40.8%	5.3%	3.6%	30.7%	.1%	1.0%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

Source data: FORS Fatality File 1990. See FORS documentation for details.

4. HOSPITAL SEPARATIONS

The tables presented in this section provide national level counts of hospital separations that have resulted from road trauma for the year 1990. The database for the tabulations was hospital morbidity records provided by all State/Territory authorities with the exception of the Northern Territory.

The unit records were weighted to account for the missing NT records and were also weighted for Queensland data which was not provided in a format enabling AIS or ISS injury severity coding. Further details of the weighting procedure are presented in Appendix A.

Table 4.1. Road Injury Hospital Separations, Australia 1990
By Age Group and Road User Type (Case Numbers and Row Percentages)

	Road user type						Total
	Driver	Passenger in motor vehicle	Motor cycle rider	Pedal cyclist	Pedestrian	Unspecified / other	
Age group							
0 - 4 yrs	3	389		322	311	127	1151
	.2%	33.8%		27.9%	27.0%	11.1%	100.0%
5 - 14 yrs	50	917	189	3115	1030	478	5779
	.9%	15.9%	3.3%	53.9%	17.8%	8.3%	100.0%
15 - 19 yrs	1562	1682	1279	1114	598	1031	7266
	21.5%	23.1%	17.6%	15.3%	8.2%	14.2%	100.0%
20 - 24 yrs	1900	1162	1271	408	452	946	6138
	31.0%	18.9%	20.7%	6.7%	7.4%	15.4%	100.0%
25 - 29 yrs	1281	626	1001	331	308	670	4216
	30.4%	14.8%	23.7%	7.8%	7.3%	15.9%	100.0%
30 - 39 yrs	1950	764	874	397	477	848	5310
	36.7%	14.4%	16.5%	7.5%	9.0%	16.0%	100.0%
40 - 49 yrs	1340	599	294	221	350	501	3306
	40.5%	18.1%	8.9%	6.7%	10.6%	15.2%	100.0%
50 - 59 yrs	893	438	122	155	335	343	2286
	39.1%	19.1%	5.3%	6.8%	14.7%	15.0%	100.0%
60 - 69 yrs	662	445	68	105	347	284	1912
	34.6%	23.3%	3.6%	5.5%	18.1%	14.9%	100.0%
70 or more years	695	574	38	98	544	306	2256
	30.8%	25.5%	1.7%	4.4%	24.1%	13.6%	100.0%
Not known	2	1			3		6
	33.3%	16.7%			50.0%		100.0%
Total	10338	7598	5135	6266	4754	5535	39626
	26.1%	19.2%	13.0%	15.8%	12.0%	14.0%	100.0%

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.8 Road Injury Hospital Separations, Australia 1990, By Road User Type and Body Region of All Injuries (Case Number and Row Percentage) (Multiple Response Table)

	Body region of all diagnoses *									Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Unspecified / other	
Road user type										
Driver	6161	2546	1783	2471	529	1133	2060	3168	1583	10338
	59.6%	24.6%	17.2%	23.9%	5.1%	11.0%	19.9%	30.6%	15.3%	100.0%
Passenger in motor vehicle	4078	1890	1018	1555	607	918	1501	1800	1177	7598
	53.7%	24.9%	13.4%	20.5%	8.0%	12.1%	19.8%	23.7%	15.5%	100.0%
Motor cycle rider	2267	810	344	471	260	310	2104	2897	480	5135
	44.1%	15.8%	6.7%	9.2%	5.1%	6.0%	41.0%	56.4%	9.3%	100.0%
Pedal cyclist	2764	1950	670	160	216	135	2055	1244	407	6266
	44.1%	31.1%	10.7%	2.6%	3.5%	2.2%	32.8%	19.9%	6.5%	100.0%
Pedestrian	2520	1634	360	486	190	148	1059	3094	503	4754
	53.0%	34.4%	7.6%	10.2%	4.0%	3.1%	22.3%	65.1%	10.6%	100.0%
Un specified / other	2325	1139	553	655	174	537	1143	1483	1186	5535
	42.0%	20.6%	10.0%	11.8%	3.1%	9.7%	20.6%	26.8%	21.4%	100.0%
Total	20115	9968	4728	5797	1976	3182	9921	13686	5334	39626
	50.8%	25.2%	11.9%	14.6%	5.0%	8.0%	25.0%	34.5%	13.5%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.9 Road Injury Hospital Separations, Australia 1990, By Road User Type and Body Region of Most Severe Injury (Case Number and Row Percentage)

	Body region of most severe injury *										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Multiple	Unspec./ other	
Road user type											
Driver	1121	1565	238	1044	166	587	550	954	3038	1076	10338
	10.8%	15.1%	2.3%	10.1%	1.6%	5.7%	5.3%	9.2%	29.4%	10.4%	100.0%
Passenger in motor vehicle	839	1226	189	627	198	561	483	688	1922	866	7598
	11.0%	16.1%	2.5%	8.2%	2.6%	7.4%	6.4%	9.1%	25.3%	11.4%	100.0%
Motor cycle rider	544	436	52	117	95	150	740	1314	1397	289	5135
	10.6%	8.5%	1.0%	2.3%	1.9%	2.9%	14.4%	25.6%	27.2%	5.6%	100.0%
Pedal cyclist	668	1538	203	44	148	75	1499	826	986	278	6266
	10.7%	24.5%	3.2%	.7%	2.4%	1.2%	23.9%	13.2%	15.7%	4.4%	100.0%
Pedestrian	329	914	35	102	36	73	272	1355	1385	255	4754
	6.9%	19.2%	.7%	2.1%	.7%	1.5%	5.7%	28.5%	29.1%	5.4%	100.0%
Un-specified / other	717	739	140	248	66	310	486	669	1196	964	5535
	13.0%	13.4%	2.5%	4.5%	1.2%	5.6%	8.8%	12.1%	21.6%	17.4%	100.0%
Total	4218	6418	857	2181	709	1756	4029	5806	9924	3728	39626
	10.6%	16.2%	2.2%	5.5%	1.8%	4.4%	10.2%	14.7%	25.0%	9.4%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.10 Road Injury Hospital Separations, Australia 1990, By Road User Type and Body Region of Most Severe Injury (Case Number and Row Percentage) Cases Selected for Maximum AIS From 1 to 3.

	Body region of most severe injury *										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extrem.	Lower extrem.	Multiple	Unspec./ other	
MAX AIS 1 - 3 **											
Driver	1121	1279	238	932	101	526	549	947	2953	10	8656
	12.9%	14.8%	2.7%	10.8%	1.2%	6.1%	6.3%	10.9%	34.1%	.1%	100.0%
Passenger in motor vehicle	839	997	189	567	142	512	483	688	1843	3	6262
	13.4%	15.9%	3.0%	9.1%	2.3%	8.2%	7.7%	11.0%	29.4%	.0%	100.0%
Motor cycle rider	544	321	52	102	56	142	739	1305	1339	4	4605
	11.8%	7.0%	1.1%	2.2%	1.2%	3.1%	16.0%	28.3%	29.1%	.1%	100.0%
Pedal cyclist	668	1400	203	41	133	64	1499	825	957	1	5791
	11.5%	24.2%	3.5%	.7%	2.3%	1.1%	25.9%	14.2%	16.5%	.0%	100.0%
Pedestrian	329	636	35	79	19	60	272	1348	1258	3	4038
	8.1%	15.7%	.9%	2.0%	.5%	1.5%	6.7%	33.4%	31.2%	.1%	100.0%
Un specified / other	717	609	140	223	49	295	486	664	1145		4329
	16.6%	14.1%	3.2%	5.2%	1.1%	6.8%	11.2%	15.3%	26.5%		100.0%
Total	4218	5243	857	1944	500	1599	4027	5778	9495	21	33682
	12.5%	15.6%	2.5%	5.8%	1.5%	4.7%	12.0%	17.2%	28.2%	.1%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.11 Road Injury Hospital Separations, Australia 1990, By Road User Type and Body Region of Most Severe Injury (Case Number and Row Percentage) Cases Selected for Maximum AIS From 4 to 6

	Body region of most severe injury *									Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extrem.	Lower extrem.	Multiple	Unspec./ other	
MAX AIS 4 - 6 **										
Driver		286		111	64	60	1	7	85	3	618
		46.3%		18.0%	10.4%	9.8%	.2%	1.1%	13.8%	.4%	100.0%
Passenger in motor vehicle		229		59	56	49			79	3	475
		48.3%		12.5%	11.8%	10.3%			16.6%	.5%	100.0%
Motor cycle rider		115		15	39	8	1	9	58	1	247
		46.5%		6.2%	15.9%	3.1%	.5%	3.6%	23.6%	.5%	100.0%
Pedal cyclist		138		3	16	12		1	30		198
		69.5%		1.3%	7.9%	5.8%		.6%	14.9%		100.0%
Pedestrian		278		23	17	13		6	127		464
		60.0%		4.9%	3.6%	2.8%		1.4%	27.4%		100.0%
Un specified / other		130		25	17	15		5	50		242
		53.7%		10.3%	7.0%	6.3%		1.9%	20.8%		100.0%
Total		1176		236	209	157	3	28	429	6	2243
		52.4%		10.5%	9.3%	7.0%	.1%	1.2%	19.1%	.3%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.12 Road Injury Hospital Separations, Australia 1990, By Body Region of Principal Diagnosis and Abbreviated Injury Score (AIS) of Principal Diagnosis (Case Number and Row Percentage)

	AIS - Principal diagnosis *						Total
	Minor	Moderate	Serious	Severe	Critical	Unspecified	
Body region - Principal diagnosis							
External	5194	1555	1			5	6756
	76.9%	23.0%	.0%			.1%	100.0%
Head	1	5809	570	867	460	12	7719
	.0%	75.3%	7.4%	11.2%	6.0%	.2%	100.0%
Face	858	863	18			397	2136
	40.2%	40.4%	.8%			18.6%	100.0%
Chest	265	1495	683	126	1	69	2640
	10.0%	56.6%	25.9%	4.8%	.0%	2.6%	100.0%
Abdomen	13	727	85	169	17	4	1014
	1.3%	71.6%	8.4%	16.7%	1.7%	.4%	100.0%
Spine	441	294	1084	111	45	18	1994
	22.1%	14.7%	54.4%	5.5%	2.3%	.9%	100.0%
Upper extremity	357	4642	402	3		166	5570
	6.4%	83.3%	7.2%	.0%		3.0%	100.0%
Lower extremity	139	4639	2981	23		289	8070
	1.7%	57.5%	36.9%	.3%		3.6%	100.0%
Unspecified / other	6	13	8		1	3699	3727
	.2%	.3%	.2%		.0%	99.2%	100.0%
Total	7276	20037	5831	1298	524	4660	39626
	18.4%	50.6%	14.7%	3.3%	1.3%	11.8%	100.0%

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.13 Road Injury Hospital Separations, Australia 1990, By Body Region of Most Severe Injury and Maximum Abbreviated Injury Score (AIS) (Case Number and Row Percentage)

	Maximum AIS **						Total
	Minor	Moderate	Serious	Severe	Critical	Unspec./ other	
Body region of most severe injury *							
External	2778	1438	3				4218
	65.8%	34.1%	.1%				100.0%
Head		4709	534	824	352		6418
		73.4%	8.3%	12.8%	5.5%		100.0%
Face	355	484	18				857
	41.4%	56.5%	2.1%				100.0%
Chest	110	1067	767	234	3		2181
	5.0%	48.9%	35.2%	10.7%	.1%		100.0%
Abdomen	13	419	68	182	27		709
	1.8%	59.1%	9.7%	25.6%	3.8%		100.0%
Spine	309	165	1125	116	41		1756
	17.6%	9.4%	64.1%	6.6%	2.3%		100.0%
Upper extremity	220	3385	422	3			4029
	5.5%	84.0%	10.5%	.1%			100.0%
Lower extremity	86	2950	2743	27	1		5806
	1.5%	50.8%	47.2%	.5%	.0%		100.0%
Multiple	2455	5388	1652	250	179		9924
	24.7%	54.3%	16.6%	2.5%	1.8%		100.0%
Unspecified / other	4	9	8	4	3	3701	3728
	.1%	.2%	.2%	.1%	.1%	99.3%	100.0%
Total	6329	20014	7339	1638	605	3701	39626
	16.0%	50.5%	18.5%	4.1%	1.5%	9.3%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.14 Road Injury Hospital Separations, Australia 1990, By Road User Type
Mean Injury Severity Score (ISS) and Abbreviated Injury Score (AIS) of Principal Diagnosis
(Case Number and Row Percentage)

	Mean ISS	AIS - Principal diagnosis *						
		Minor	Moderate	Serious	Severe	Critical	Unspecified	Total
Road user type								
Driver	6.8	2241	4906	1348	343	131	1368	10338
		21.7%	47.5%	13.0%	3.3%	1.3%	13.2%	100.0%
Passenger in motor vehicle	6.6	1575	3442	1149	275	117	1040	7598
		20.7%	45.3%	15.1%	3.6%	1.5%	13.7%	100.0%
Motor cycle rider	6.8	660	2789	1096	135	69	388	5135
		12.8%	54.3%	21.3%	2.6%	1.3%	7.5%	100.0%
Pedal cyclist	5.0	1102	4059	582	130	40	353	6266
		17.6%	64.8%	9.3%	2.1%	.6%	5.6%	100.0%
Pedestrian	7.9	587	2434	977	266	127	362	4754
		12.3%	51.2%	20.6%	5.6%	2.7%	7.6%	100.0%
Un specified / other	5.3	1111	2407	679	149	40	1149	5535
		20.1%	43.5%	12.3%	2.7%	.7%	20.8%	100.0%
Total	6.4	7276	20037	5831	1298	524	4660	39626
		18.4%	50.6%	14.7%	3.3%	1.3%	11.8%	100.0%

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.15 Road Injury Hospital Separations, Australia 1990, By Road User Type and Maximum Abbreviated Injury Score (AIS) (Case Number and Row Percentage)

	Maximum AIS *						Total
	Minor	Moderate	Serious	Severe	Critical	Unspec.	
Road user type							
Driver	1890	4945	1822	465	153	1063	10338
	18.3%	47.8%	17.6%	4.5%	1.5%	10.3%	100.0%
Passenger in motor vehicle	1356	3423	1483	339	136	861	7598
	17.8%	45.1%	19.5%	4.5%	1.8%	11.3%	100.0%
Motor cycle rider	561	2736	1308	170	77	284	5135
	10.9%	53.3%	25.5%	3.3%	1.5%	5.5%	100.0%
Pedal cyclist	999	4135	657	156	42	277	6266
	15.9%	66.0%	10.5%	2.5%	.7%	4.4%	100.0%
Pedestrian	507	2309	1222	322	141	252	4754
	10.7%	48.6%	25.7%	6.8%	3.0%	5.3%	100.0%
Un specified / other	1016	2466	847	186	56	964	5535
	18.4%	44.6%	15.3%	3.4%	1.0%	17.4%	100.0%
Total	6329	20014	7339	1638	605	3701	39626
	16.0%	50.5%	18.5%	4.1%	1.5%	9.3%	100.0%

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.16 Road Injury Hospital Separations, Australia 1990, By Road User Type Over Body Region of Principal Diagnosis and Abbreviated Injury Score (AIS) of Principal Diagnosis (Case Number and Row Percentage)

	AIS - Principal diagnosis *						Total
	Minor	Moderate	Serious	Severe	Critical	Unspecified	
Driver							
External	1532	399				3	1934
	79.2%	20.6%				.1%	100.0%
Head	1	1465	105	181	116	5	1874
	.1%	78.2%	5.6%	9.7%	6.2%	.3%	100.0%
Face	303	296	7			157	763
	39.8%	38.8%	.9%			20.6%	100.0%
Chest	121	754	289	61		29	1254
	9.7%	60.1%	23.0%	4.8%		2.3%	100.0%
Abdomen		182	15	44	6		247
		73.4%	6.2%	17.8%	2.6%		100.0%
Spine	202	129	330	50	9	8	728
	27.7%	17.7%	45.3%	6.9%	1.2%	1.1%	100.0%
Upper extremity	60	723	116	1		43	944
	6.3%	76.7%	12.3%	.1%		4.6%	100.0%
Lower extremity	19	955	483	5		53	1514
	1.2%	63.0%	31.9%	.3%		3.5%	100.0%
Unspecified / other	3	4	4			1070	1080
	.2%	.4%	.4%			99.0%	100.0%
Total	2241	4906	1348	343	131	1368	10338
	21.7%	47.5%	13.0%	3.3%	1.3%	13.2%	100.0%
Passenger in motor vehicle							
External	1152	257				1	1410
	81.7%	18.2%				.1%	100.0%
Head		1090	117	169	94	3	1473
		74.0%	8.0%	11.5%	6.4%	.2%	100.0%
Face	159	205	3			111	477
	33.3%	43.0%	.5%			23.2%	100.0%
Chest	77	481	148	30		19	756
	10.2%	63.6%	19.6%	4.0%		2.5%	100.0%
Abdomen		222	41	47	2		313
		71.0%	13.2%	15.1%	.8%		100.0%
Spine	108	76	367	28	19		598
	18.0%	12.7%	61.3%	4.7%	3.2%		100.0%
Upper extremity	53	578	61			52	745
	7.1%	77.6%	8.2%			7.0%	100.0%
Lower extremity	24	531	412			44	1010
	2.3%	52.5%	40.8%			4.4%	100.0%
Unspecified / other	3	3			1	809	816
	.3%	.3%			.2%	99.2%	100.0%
Total	1575	3442	1149	275	117	1040	7598
	20.7%	45.3%	15.1%	3.6%	1.5%	13.7%	100.0%

(continued)

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.16 Road Injury Hospital Separations, Australia 1990, By Road User Type Over Body Region of Principal Diagnosis and Abbreviated Injury Score (AIS) of Principal Diagnosis (Case Number and Row Percentage)

	AIS - Principal diagnosis *						Total
	Minor	Moderate	Serious	Severe	Critical	Unspecified	
Motor cycle rider							
External	477	306					783
	61.0%	39.0%					100.0%
Head		398	45	77	57	1	578
		68.7%	7.8%	13.3%	9.9%	.2%	100.0%
Face	50	79	1			12	143
	35.2%	55.4%	.9%			8.5%	100.0%
Chest	17	32	81	9		10	149
	11.2%	21.5%	54.4%	6.0%		6.9%	100.0%
Abdomen		80	12	35	4		131
		61.1%	8.9%	26.9%	3.1%		100.0%
Spine	8	13	130	4	8	3	165
	4.9%	7.7%	78.8%	2.3%	4.7%	1.6%	100.0%
Upper extremity	70	935	83	1		16	1105
	6.4%	84.6%	7.5%	.1%		1.4%	100.0%
Lower extremity	37	946	741	9		62	1794
	2.1%	52.7%	41.3%	.5%		3.5%	100.0%
Unspecified / other		1	3			284	287
		.5%	.9%			98.6%	100.0%
Total	660	2789	1096	135	69	388	5135
	12.8%	54.3%	21.3%	2.6%	1.3%	7.5%	100.0%
Pedal cyclist							
External	766	223					989
	77.4%	22.6%					100.0%
Head		1453	107	112	36		1707
		85.1%	6.2%	6.6%	2.1%		100.0%
Face	191	125	1			42	359
	53.2%	34.8%	.4%			11.7%	100.0%
Chest	5	19	31	1		1	58
	8.8%	33.2%	53.4%	2.3%		2.3%	100.0%
Abdomen	13	134	4	14	1	4	171
	7.6%	78.6%	2.3%	8.4%	.8%	2.3%	100.0%
Spine	5	8	54	3	3	1	73
	7.1%	10.6%	73.6%	3.5%	3.4%	1.8%	100.0%
Upper extremity	95	1500	59			9	1663
	5.7%	90.2%	3.5%			.5%	100.0%
Lower extremity	27	597	326			32	983
	2.8%	60.8%	33.2%			3.3%	100.0%
Unspecified / other			1			263	265
			.5%			99.5%	100.0%
Total	1102	4059	582	130	40	353	6266
	17.6%	64.8%	9.3%	2.1%	.6%	5.6%	100.0%

(continued)

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.16 Road Injury Hospital Separations, Australia 1990, By Road User Type Over Body Region of Principal Diagnosis and Abbreviated Injury Score (AIS) of Principal Diagnosis (Case Number and Row Percentage)

	AIS - Principal diagnosis *						Total
	Minor	Moderate	Serious	Severe	Critical	Unspecified	
Pedestrian							
External	509	111	1			1	622
	81.8%	17.8%	.2%			.2%	100.0%
Head		730	131	224	122	3	1210
		60.4%	10.8%	18.5%	10.1%	.2%	100.0%
Face	33	47	1			11	93
	36.1%	51.1%	1.4%			11.4%	100.0%
Chest	13	36	52	11	1	5	119
	11.1%	30.3%	43.8%	9.4%	1.0%	4.4%	100.0%
Abdomen		45	6	15	1		69
		66.2%	9.3%	22.6%	1.9%		100.0%
Spine	1	1	44	12	3		61
	2.1%	2.1%	72.7%	18.9%	4.2%		100.0%
Upper extremity	13	375	49			5	442
	3.0%	84.8%	11.1%			1.2%	100.0%
Lower extremity	16	1084	692	4		45	1841
	.8%	58.9%	37.6%	.2%		2.5%	100.0%
Unspecified / other	1	4				292	297
	.4%	1.3%				98.3%	100.0%
Total	587	2434	977	266	127	362	4754
	12.3%	51.2%	20.6%	5.6%	2.7%	7.6%	100.0%
Un specified / other							
External	758	260					1018
	74.5%	25.5%					100.0%
Head		673	65	104	35		877
		76.7%	7.4%	11.8%	4.0%		100.0%
Face	121	111	5			65	301
	40.1%	36.7%	1.7%			21.4%	100.0%
Chest	31	174	82	14		4	304
	10.3%	57.0%	27.0%	4.4%		1.3%	100.0%
Abdomen		63	6	13	1		84
		75.3%	7.7%	15.4%	1.6%		100.0%
Spine	117	68	159	14	4	6	368
	31.8%	18.4%	43.2%	3.8%	1.0%	1.7%	100.0%
Upper extremity	66	531	34			41	672
	9.8%	79.0%	5.0%			6.1%	100.0%
Lower extremity	17	527	327	5		53	928
	1.9%	56.7%	35.2%	.5%		5.7%	100.0%
Unspecified / other		1				981	982
		.1%				99.9%	100.0%
Total	1111	2407	679	149	40	1149	5535
	20.1%	43.5%	12.3%	2.7%	.7%	20.8%	100.0%

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.17 Road Injury Hospital Separations, Australia 1990, By Road User Type Over Body Region of Most Severe Injury * and Maximum Abbreviated Injury Score (AIS) (Case Number and Row Percentage)

	Maximum AIS **						Total
	Minor	Moderate	Serious	Severe	Critical	Unspec.	
Road user type							
Driver							
External	782	338	1				1121
	69.8%	30.1%	.1%				100.0%
Head		1169	110	183	103		1565
		74.7%	7.0%	11.7%	6.6%		100.0%
Face	86	147	5				238
	36.2%	61.6%	2.1%				100.0%
Chest	47	566	320	111			1044
	4.5%	54.2%	30.6%	10.7%			100.0%
Abdomen		87	14	56	9		166
		52.7%	8.5%	33.5%	5.3%		100.0%
Spine	139	64	323	50	10		587
	23.7%	10.9%	55.0%	8.6%	1.8%		100.0%
Upper extremity	30	404	114	1			550
	5.5%	73.5%	20.7%	.2%			100.0%
Lower extremity	11	476	460	7			954
	1.1%	49.9%	48.3%	.7%			100.0%
Multiple	792	1690	472	56	30		3038
	26.1%	55.6%	15.5%	1.8%	1.0%		100.0%
Unspecified / other	3	4	4	1	1	1063	1076
	.2%	.4%	.4%	.1%	.1%	98.8%	100.0%
Total	1890	4945	1822	465	153	1063	10338
	18.3%	47.8%	17.6%	4.5%	1.5%	10.3%	100.0%
Passenger in motor vehicle							
External	590	250					839
	70.3%	29.7%					100.0%
Head		894	103	150	79		1226
		72.9%	8.4%	12.2%	6.5%		100.0%
Face	69	116	4				189
	36.6%	61.3%	2.1%				100.0%
Chest	35	334	199	59			627
	5.6%	53.2%	31.7%	9.5%			100.0%
Abdomen		110	32	48	8		198
		55.4%	16.3%	24.4%	3.8%		100.0%
Spine	70	43	399	30	19		561
	12.5%	7.6%	71.2%	5.3%	3.4%		100.0%
Upper extremity	26	400	57				483
	5.4%	82.7%	11.9%				100.0%
Lower extremity	6	300	382				688
	.9%	43.6%	55.5%				100.0%
Multiple	559	978	306	50	29		1922
	29.1%	50.9%	15.9%	2.6%	1.5%		100.0%
Unspecified / other	1	1		1	1	861	866
	.1%	.2%		.1%	.1%	99.4%	100.0%
Total	1356	3423	1483	339	136	861	7598
	17.8%	45.1%	19.5%	4.5%	1.8%	11.3%	100.0%

(continued)

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.17 Road Injury Hospital Separations, Australia 1990, By Road User Type Over Body Region of Most Severe Injury * and Maximum Abbreviated Injury Score (AIS) (Case Number and Row Percentage)

	Maximum AIS **						Total
	Minor	Moderate	Serious	Severe	Critical	Unspec.	
Motor cycle rider							
External	261	283					544
	48.0%	52.0%					100.0%
Head		289	32	76	39		436
		66.3%	7.4%	17.3%	9.0%		100.0%
Face	13	38	1				52
	25.0%	72.5%	2.5%				100.0%
Chest	8	15	79	14	1		117
	6.5%	13.2%	67.2%	12.0%	1.1%		100.0%
Abdomen		51	5	35	4		95
		53.6%	5.4%	36.8%	4.2%		100.0%
Spine	8	5	129	4	4		150
	5.4%	3.4%	86.0%	2.6%	2.6%		100.0%
Upper extremity	48	592	99	1			740
	6.5%	80.0%	13.4%	.2%			100.0%
Lower extremity	21	659	625	9			1314
	1.6%	50.2%	47.5%	.7%			100.0%
Multiple	202	802	336	30	28		1397
	14.4%	57.4%	24.0%	2.1%	2.0%		100.0%
Unspecified / other		1	3	1		284	289
		.5%	.9%	.4%		98.2%	100.0%
Total	561	2736	1308	170	77	284	5135
	10.9%	53.3%	25.5%	3.3%	1.5%	5.5%	100.0%
Pedal cyclist							
External	462	206					668
	69.1%	30.9%					100.0%
Head		1295	105	113	25		1538
		84.2%	6.8%	7.4%	1.6%		100.0%
Face	107	96					203
	52.8%	47.2%					100.0%
Chest	3	14	24	3			44
	5.8%	32.2%	56.2%	5.8%			100.0%
Abdomen	13	113	7	14	1		148
	8.8%	76.2%	4.5%	9.7%	.9%		100.0%
Spine		6	57	9	3		75
		8.5%	76.3%	12.0%	3.3%		100.0%
Upper extremity	70	1356	73				1499
	4.7%	90.4%	4.9%				100.0%
Lower extremity	23	490	312		1		826
	2.8%	59.3%	37.7%		.1%		100.0%
Multiple	321	558	77	17	13		986
	32.6%	56.6%	7.9%	1.7%	1.3%		100.0%
Unspecified / other			1			277	278
			.5%			99.5%	100.0%
Total	999	4135	657	156	42	277	6266
	15.9%	66.0%	10.5%	2.5%	.7%	4.4%	100.0%

(continued)

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.17 Road Injury Hospital Separations, Australia 1990, By Road User Type Over Body Region of Most Severe Injury * and Maximum Abbreviated Injury Score (AIS) (Case Number and Row Percentage)

	Maximum AIS **						Total
	Minor	Moderate	Serious	Severe	Critical	Unspec.	
Pedestrian							
External	216	111	1				329
	65.7%	33.9%	.4%				100.0%
Head		507	129	198	80		914
		55.5%	14.1%	21.7%	8.7%		100.0%
Face	11	22	1				35
	33.3%	63.0%	3.8%				100.0%
Chest		15	64	21	1		102
		14.9%	62.8%	21.1%	1.2%		100.0%
Abdomen		15	4	16	1		36
		41.9%	10.7%	43.7%	3.6%		100.0%
Spine	1		59	12	1		73
	1.8%		80.7%	15.8%	1.8%		100.0%
Upper extremity	6	225	40				272
	2.4%	83.0%	14.7%				100.0%
Lower extremity	13	669	666	6			1355
	1.0%	49.4%	49.2%	.5%			100.0%
Multiple	258	742	258	69	58		1385
	18.7%	53.5%	18.6%	5.0%	4.2%		100.0%
Unspecified / other		3				252	255
		1.0%				99.0%	100.0%
Total	507	2309	1222	322	141	252	4754
	10.7%	48.6%	25.7%	6.8%	3.0%	5.3%	100.0%
Un specified / other							
External	467	250					717
	65.1%	34.9%					100.0%
Head		555	55	104	26		739
		75.0%	7.4%	14.1%	3.5%		100.0%
Face	68	66	6				140
	48.4%	47.0%	4.6%				100.0%
Chest	18	123	82	25			248
	7.4%	49.6%	33.0%	10.0%			100.0%
Abdomen		42	6	13	4		66
		64.6%	9.8%	19.6%	6.0%		100.0%
Spine	90	47	158	12	4		310
	29.0%	15.2%	50.8%	3.7%	1.2%		100.0%
Upper extremity	39	408	39				486
	8.0%	84.0%	8.0%				100.0%
Lower extremity	11	356	298	5			669
	1.6%	53.1%	44.5%	.7%			100.0%
Multiple	323	619	203	28	22		1196
	27.0%	51.8%	17.0%	2.4%	1.8%		100.0%
Unspecified / other						964	964
						100.0%	100.0%
Total	1016	2466	847	186	56	964	5535
	18.4%	44.6%	15.3%	3.4%	1.0%	17.4%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

** AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.18 Road Injury Hospital Separations, Australia 1990, By Abbreviated Injury Score (AIS) of Principal Diagnosis and Maximum Abbreviated Injury Score (AIS) (Case Number and Row Percentage)

	Maximum AIS *						Total
	Minor	Moderate	Serious	Severe	Critical	Unspecified	
AIS - Principal diagnosis *							
Minor	5964	1140	153	14	4		7276
	82.0%	15.7%	2.1%	.2%	.1%		100.0%
Moderate		18494	1369	158	15		20037
		92.3%	6.8%	.8%	.1%		100.0%
Serious			5666	142	23		5831
			97.2%	2.4%	.4%		100.0%
Severe				1286	13		1298
				99.0%	1.0%		100.0%
Critical					524		524
					100.0%		100.0%
Unspecified	365	379	151	38	26	3701	4660
	7.8%	8.1%	3.2%	.8%	.6%	79.4%	100.0%
Total	6329	20014	7339	1638	605	3701	39626
	16.0%	50.5%	18.5%	4.1%	1.5%	9.3%	100.0%

* AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see the following manual - The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, 2340 Des Plaines River Road, Suite 106, Des Plaines, Illinois.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.19 Road Injury Hospital Separations, Australia 1990, By Body Region of Principal Diagnosis and Body Region of Most Severe Injury (Case Number and Row Percentage)

	Body region of most severe injury *										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Multiple	Unspec./ other	
Body region - Principal diagnosis											
External	4175	203	28	69	13	28	86	73	2082	1	6756
	61.8%	3.0%	.4%	1.0%	.2%	.4%	1.3%	1.1%	30.8%	.0%	100.0%
Head		5968		61	17	53	9	62	1547	3	7719
		77.3%		.8%	.2%	.7%	.1%	.8%	20.0%	.0%	100.0%
Face	28	114	828	27	3	26	36	35	699	341	2136
	1.3%	5.3%	38.8%	1.3%	.1%	1.2%	1.7%	1.6%	32.7%	16.0%	100.0%
Chest	8	14		1819	15	42	18	15	679	29	2640
	.3%	.5%		68.9%	.6%	1.6%	.7%	.6%	25.7%	1.1%	100.0%
Abdomen		13		38	637	20		14	286	5	1014
		1.3%		3.8%	62.8%	1.9%		1.4%	28.2%	.5%	100.0%
Spine	1	41		16	4	1501		4	410	16	1994
	.1%	2.1%		.8%	.2%	75.3%		.2%	20.5%	.8%	100.0%
Upper extremity	5	15		75	4	49	3866	59	1357	139	5570
	.1%	.3%		1.4%	.1%	.9%	69.4%	1.1%	24.4%	2.5%	100.0%
Lower extremity	1	50	1	74	15	38	14	5543	2098	235	8070
	.0%	.6%	.0%	.9%	.2%	.5%	.2%	68.7%	26.0%	2.9%	100.0%
Unspecified / other					1				767	2959	3727
					.0%				20.6%	79.4%	100.0%
Total	4218	6418	857	2181	709	1756	4029	5806	9924	3728	39626
	10.6%	16.2%	2.2%	5.5%	1.8%	4.4%	10.2%	14.7%	25.0%	9.4%	100.0%

* Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.20 Road Injury Hospital Separations, Australia 1990, By Body Region of Principal Diagnosis and Body Region of Most Severe Injury - Selected Cases * (Case Number and Row Percentage)

	Body region of most severe injury **										Total
	External	Head	Face	Chest	Abdomen	Spine	Upper extremity	Lower extremity	Multiple	Unspec./ other	
Body region - Principal diagnosis											
External	1	9	1	36	4	25	14	24	21	1	136
	.9%	6.6%	1.0%	26.3%	2.9%	18.4%	10.4%	17.4%	15.1%	.9%	100.0%
Head		54		56	13	50	9	62	56		301
		18.1%		18.6%	4.3%	16.6%	3.1%	20.7%	18.6%		100.0%
Face		48	4	27		26	5	23	12	1	146
		32.8%	2.6%	18.5%		17.6%	3.5%	16.0%	8.0%	.9%	100.0%
Chest		4		124	4	41	4	4	28		208
		1.8%		59.7%	1.8%	19.5%	1.8%	1.9%	13.5%		100.0%
Abdomen		8		37	19	20		13	50	1	148
		5.5%		25.1%	13.0%	13.2%		8.7%	33.7%	.9%	100.0%
Spine		9		6		19		1	9		45
		20.1%		14.2%		43.1%		2.8%	19.8%		100.0%
Upper extremity		10		71		49	57	57	48	1	294
		3.5%		24.3%		16.7%	19.4%	19.3%	16.3%	.4%	100.0%
Lower extremity		23	1	65	6	38	13	196	91		434
		5.3%	.3%	15.0%	1.5%	8.9%	3.0%	45.1%	20.9%		100.0%
Unspecified / other					1				1		3
					50.3%				49.7%		100.0%
Total	1	166	6	423	48	268	102	380	315	5	1714
	.1%	9.7%	.4%	24.7%	2.8%	15.6%	6.0%	22.2%	18.4%	.3%	100.0%

* The table includes only those cases for which the AIS of the principal diagnosis is not a good indicator of maximum AIS ie where principal diagnosis was minor or moderate and the maximum AIS was more severe (serious, severe or critical). The table indicates that for some cases a principal diagnosis and the maximum AIS of the secondary diagnoses were recorded for the same body region with one of the secondary diagnosis codes indicating a more severe injury than the principal diagnosis code within that body region. For other cases, the AIS severity of one of the secondary diagnoses was higher than the principal diagnosis AIS and in a different body region. For example 18% of the selected cases having a principal diagnosis to the head, had a secondary diagnosis with a higher AIS score to the head. 88% of selected cases with a principal diagnosis of head injury had a secondary diagnosis with a higher AIS score in a body region other than the head e.g. 17% involved spinal injury.

** Cases for which the maximum Abbreviated Injury Score (AIS) was tied for two or more body regions were allocated to the 'multiple' body region category.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.21 Road Injury Hospital Separations, Australia 1990, By Length of Hospital Stay and Road User Type (Mean Bed Days, Length of Stay and Total Bed Days)

	Mean Bed Days	Length of stay *			Total Bed Days **
		1-2 days	3-6 days	> 6 days	
Road user type					
Driver	7.7	4889 47.3%	2358 22.8%	3091 29.9%	80054 25.2%
Passenger in motor vehicle	8.2	3703 48.7%	1702 22.4%	2193 28.9%	61964 19.5%
Motor cycle rider	9.2	1982 38.6%	1286 25.0%	1867 36.4%	47192 14.9%
Pedal cyclist	3.9	4122 65.8%	1283 20.5%	861 13.7%	24710 7.8%
Pedestrian	12.9	1742 36.6%	943 19.8%	2070 43.5%	61343 19.3%
Un specified / other	7.6	2947 53.2%	1164 21.0%	1424 25.7%	42105 13.3%
Total	8.0	19386 48.9%	8736 22.0%	11505 29.0%	317369 100%

* Percentages are within rows.

** Percentage is within the column.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

Table 4.22 Road Injury Hospital Separations, Australia 1990, By Length of Hospital Stay and Road User Type (Mean Bed Days, Length of Stay and Total Bed Days)

	Mean Bed Days	Length of stay *			Total Bed Days **
		1-2 days	3-6 days	> 6 days	
Body region -					
External	3.8	4300 63.6%	1529 22.6%	927 13.7%	25525 8.0%
Head	7.7	50 4 65.1%	1118 14.5%	1577 20.4%	59150 18.6%
Face	4.6	1101 51.5%	617 28.9%	418 19.6%	9773 3.1%
Chest	7.1	823 31.2%	929 35.2%	887 33.6%	18760 5.9%
Abdomen	10.1	275 27.1%	206 20.3%	534 52.6%	10240 3.2%
Spine	15.0	682 34.2%	471 23.6%	840 42.1%	29991 9.4%
Upper extremity	4.9	3237 58.1%	1280 23.0%	1053 18.9%	27433 8.6%
Lower extremity	14.2	1603 19.9%	1889 23.4%	4578 56.7%	114843 36.2%
Unspecified / other	5.8	2341 62.8%	695 18.6%	691 18.5%	21655 6.8%
Total	8.0	19386 48.9%	8736 22.0%	11505 29.0%	317369 100%

* Percentages are within rows

** Percentage is within the column.

Source data: State and Territory Hospital Morbidity Data. See Appendix A.

APPENDIX A: TECHNICAL NOTES

1. Data Sources

The data presented in this report are derived from two main sources; tabulations of hospital separations are derived from the hospital morbidity collections maintained by State and Territory Health Authorities whilst the tabulations of fatalities were derived from the Federal Office of Road Safety Fatality File.

Population data

The population data used as the denominator for rate calculations throughout this report was the estimated resident population of Australia for 1990 based on the 1991 Census of Population and Housing (Australian Bureau of Statistics, 1993).

Data on hospital separations

Unit record hospital morbidity data was provided by all States and Territories as requested for the calender years 1988 and 1990. Data sets held by the National Injury Surveillance Unit (NISU) for 1988 were used where available.

Hospital morbidity data was unavailable for the Northern Territory for the calendar year 1990 while data was unavailable for the ACT and Tasmania for the calendar year 1988.

Table A.1 Data Provision

Year	NSW	Vic.	Qld.	SA	WA	Tas.	NT	ACT
1988	* -	*	* +	*	*	NA	* +	NA
1990	*	*	* +	*	*	*	NA	*

* - Principal diagnosis only
* + ICD9 only (not ICD-9CM)
NA Data was not available

The hospital morbidity data presented here includes all cases where the main reason for admission (primary diagnosis) was attributed to an "external cause" related to road transport. This was defined as ICD9 "external cause" codes E810-819 and E826 (World Health Organisation, 1977).

Diagnosis data provided by most jurisdictions had been classified according to the clinical modification to the ninth revision of the International Classification of Diseases ie. ICD-9CM (Commission on professional and hospital activities, 1980). Data from Queensland and the Northern Territory, however, was classified according to the less detailed standard International Classification of Diseases (World Health Organisation, 1977).

The New South Wales data for 1988 available to NISU (based on financial year 88/89) did not contain codes for secondary diagnoses.

Data on fatalities

The Fatality Files for 1988 and 1990 were provided in unit record form by the Federal Office of Road Safety. The Fatality File contains records of all persons injured and all vehicle operators involved in fatal accidents and includes therefore records for persons who were not killed as a result of the accident. For the tables presented in this report only records of persons who died as a result of road trauma were selected.

The 1988 Fatality File included information on up to 10 injuries for each case. The information for each injury was coded according to the Abbreviated Injury Scale to identify the body region injured (according to the nine category classification which forms part of the AIS) and the severity of injury (according to the six category classification which forms part of the AIS). In 1990 up to 12 injuries were coded for each case. The 1990 Fatality File used the AIS 1990 revision while the 1988 Fatality File used the 1985 revision of the AIS, a change which is unlikely to have affected body region comparisons or ISS deviations significantly (see Talucci et al, 1993; AAAM Committee on Injury Scaling, 1990; AAAM Committee on Injury Scaling, 1985).

2. Data Manipulation

Hospital morbidity data was processed using the ICDMAP software (see MacKenzie et al, 1989) to produce Abbreviated Injury Scale codes and Injury Severity Scores on the basis of ICD-9CM Diagnoses. The software maps each ICD-9CM code to an AIS-85 code. The AIS-85 code cannot be mapped from ICD9 codes which do not have the clinical modification. The software was developed using a modified delphi technique to rate the ICD-9CM to AIS-85 assignments and involved a panel from the Injury Scaling Committee of the American Association for Automotive Medicine. Unambiguous mapping of AIS-85 codes is possible for most ICD-9CM codes. The reliability of the mapping is lowest for injuries in the head/neck body region. Percent agreement amongst the panel members in the assignment of maximum AIS scores in the head/neck body region was 48% and compared with a 62% found in studies involving direct coding of AIS from hospital medical charts. Based on a number of studies by the authors (eg. Mackenzie et al, 1986; Steinwachs et al, 1987), MacKenzie et al (1989) consider that the map "provides reasonably good information on severity that might otherwise be unavailable for large population-based research and evaluation". The satisfactory performance of the map is supported by The Association for the Advancement of Automotive Medicine (see The Abbreviated Injury Scale, 1990 Revision). It is understood that an updated version of the map using AIS-90, which has improved reliability coefficients, will be available for the next edition of the present report which will be based on 1992 hospital data (personal communication with MacKenzie).

The validity of the AIS codes assigned using the map depends on the quality of the ICD-9CM coded input data. While published evaluations are lacking, the authors of a recent study based on hospital separations data from all states and territories for 1989-90 judged that "the morbidity collections still vary in quality, scope and definition ... most sociodemographic and administrative data are reasonably reliable ... for most diseases the data are reliable". These authors made no special mention of injury (Gillett et al, 1993).

Injury Severity Score was calculated from the separate AIS scores for each case, using the method proposed by Baker et al (1974). ISS has been shown to predict probability of survival well, particularly for road injury (Bull, 1975) though other methods may be better for injury more generally (Copes et al, 1990).

1990 Morbidity Records

The number of diagnoses contained in the available hospital morbidity data sets for New South Wales and Victoria for 1990 was restricted to primary diagnosis and a maximum of four secondary diagnoses. Accordingly the number of diagnoses for each record in the data set for each State/Territory was limited to five. As indicated in table A.1, diagnoses codes provided by Queensland for 1990 were ICD9 codes and therefore could not be mapped for injury severity using the ICDMAP. The ICDMAP requires ICD-9CM codes.

As injury severity (AIS or ISS) could not be calculated for the Queensland data these records could not be included in those tables in which injury severity (AIS or ISS) was a variable. To account for these missing records the data for 1990 was weighted by the following weighting factor:

Wt1 = total records/(total records - Qld records).

As records had not been provided for the Northern Territory for 1990 the data for 1990 was further weighted on the basis of population to provide national estimates. The population weighting was calculated as follows:

Wt2 = national population/(national population - population of the NT).

Population figures (estimated resident population for 1990) were derived from the 1991 Census of Population & Housing (see Australian Bureau of Statistics, 1993).

While Queensland records could have been included in tabulations that did not include injury severity this would have resulted in two distributions appearing in the report for some variables which may have been confusing to the reader. For this reason Queensland records for the 1990 hospital morbidity data set were omitted from all tabulations with the exception of E-Code.

The factor having the greatest impact on the distribution of the variables was the missing Queensland records. The distribution of body region for the year 1990 is compared below with Queensland records included and excluded to provide an indication of the variation due to the omission. It can be seen that the variation is very small (i.e. less than 0.7% for principal diagnosis).

	Principal Diagnosis		All Diagnoses	
	Qld. excl.	Qld. inc.	Qld. excl.	Qld. inc.
External	17.0%	17.7%	50.8%	44.1%
Head	19.5%	19.9%	25.2%	24.4%
Face	5.4%	5.3%	11.9%	10.4%
Chest	6.7%	6.6%	14.6%	12.9%
Abdomen	2.6%	2.5%	5.0%	4.4%
Spine	5.0%	4.9%	8.0%	7.3%
Upper extremity	14.1%	13.9%	25.1%	22.6%
Lower extremity	20.4%	20.2%	34.5%	31.4%
Unspec./ other	9.4%	8.9%	13.5%	12.1%
Total	100%	100%	100%	100%

1988 Morbidity Records

The 1988 hospital morbidity data for New South Wales available to NISU included only the primary diagnosis. AIS could be calculated only for that diagnosis and ISS could not be calculated.

Records provided for Queensland and the Northern Territory for the year 1988 were ICD9 (not ICD-9CM) and could not be mapped for injury severity. To maintain consistency between the 1988 data set and the 1990 data set for comparative purposes the Queensland and Northern Territory records were excluded for all tabulations with the exception of E-Code.

In addition to the above, records for the ACT and Tasmania were unavailable for 1988.

To provide national estimates for 1988 the data was weighted using a process similar to the procedure outlined for the 1990 data set.

Whilst it might be argued that the records for Tasmania and the ACT should also have been excluded from the 1990 data set to maintain consistency it was determined after comparison of the distribution of variables from the 1990 data set with records for Tasmania and the ACT both included and excluded that the exclusion of those records would not significantly influence the distribution of the variables of interest.

The distribution of body region both with and without Tasmanian and ACT records for 1990 is presented below. It can again be seen that there is very little difference in the distribution of body region when the records for TAS/ACT are excluded.

	Principal Diagnosis		All Diagnoses	
	TAS/ACT excl.	TAS/ACT inc.	TAS/ACT excl.	TAS/ACT inc.
External	17.2%	17.0%	51.3%	50.8%
Head	19.5%	19.5%	25.2%	25.2%
Face	5.3%	5.4%	11.8%	11.9%
Chest	6.5%	6.7%	14.3%	14.6%
Abdomen	2.5%	2.6%	4.9%	5.0%
Spine	5.0%	5.0%	8.0%	8.0%
Upper extremity	14.0%	14.1%	24.9%	25.0%
Lower extremity	20.2%	20.4%	34.4%	34.5%
Unspecified	9.5%	9.4%	13.7%	13.5%
Total	100%	100%	100%	100%

Percentage change between 1988 and 1990 was calculated as the difference between the number of cases (or injuries) for the two years over the figure for 1988. The 1988 figure is the base, therefore, for the calculation of change.

"External Cause" codes for "Fatality File" data

The "Fatality File" dataset does not include ICD9 'External Cause' codes. For the purposes of this report, a 3-digit 'External Cause' code in the range E819-819, and 826 was ascribed to each case on the basis of values of three variables in the "Fatality File": "Primary Accident Class", "DCA Event" and "Person Location in the Vehicle". The algorithm for this translation in available on request from the National Injury Surveillance Unit.

3. Notes on Table Formats

Whilst the majority of the tabulations in the report are quite straightforward there are a number of table formats which some readers may not be familiar with. For example, table 4.5 is called a "multiple response" table. Tables percentages do not refer to cases in the normal way. Rather, the denominator for the calculation of percentages in any cell is the total number of injuries for all cases in that cell, there being a maximum of five injuries recorded for each case. The percentage figures therefore refer to all injuries received rather than to the number of cases.

Tables 4.6, 4.7, 4.10 and 4.11 are not based on all cases but rather on selections of cases on the basis of severity of injury. For example, table 4.6 is only based on those cases having an AIS score of 1-3 and table 4.7 is based only on those cases having an AIS score of 4-6. Selection in this way enables a third variable to be entered into a two-way cross-tabulation.

APPENDIX B: GLOSSARY OF TERMS

WORD/ PHRASE	DESCRIPTION
Abbreviated Injury Scale	The Abbreviated Injury Scale is the most widely used severity scoring system. Severity is assigned based on anatomical descriptors of the injury. AIS scoring is as follows: 1 - Minor, 2 - Moderate, 3 - Serious, 4 - Severe, 5 - Critical, 6 - Maximum Injury, 9 - Unspecified. For further information see "The Abbreviated Injury Scale, 1990 Revision. Association for the Advancement of Automotive Medicine, Des Plaines, Illinois".
Age specific rate	The rate for a specified age group. The numerator and denominator refer to the same age group. Example: Age specific fatality rate = (age 0-4 yrs.) $\frac{\text{No. of deaths 0-4 yr. olds}}{\text{Population of 0-4 yr. olds}} \times 100{,}000$
All diagnoses	The diagnoses or conditions (including principal diagnosis) that existed at the time of the patient's admission to the hospital and for which treatment was given; that affected the patient's treatment and/or length of stay in hospital by greater than one day; that arose during the patient's stay in hospital - see National Health Data Dictionary (1993) AIH&W, Canberra. They are coded according to ICD-9CM in most States & Territories. See also "Principal Diagnosis".
Bed occupancy or Bed days	The total number of days of stay for patients who were formally admitted to hospital for at least one day and underwent separation during the year (calendar year for the purposes of this report).
Body region	The Abbreviated Injury Scale identifies 9 body regions of injury ie. head, face, neck, thorax, abdomen, spine, upper extremity, lower extremity and unspecified region. See "The abbreviated injury scale - 1990 revision (1990) Association for the Advancement of Automotive Medicine, Des Plaines, Illinois".
DCA	Defines the road user movement during the road crash event. DCA stands for Definition for Classifying Accidents - see FORS "Fatality File" documentation for details.
E-code	External cause of injury and poisoning is coded by hospitals according to a classification that is part of the International Classification of Diseases. See "Supplementary classification of external cause of injury and poisoning" on pages 547-634 of the International Classification of Diseases, Ninth revision, Volume 1 (1977) World Health Organisation, Geneva.
Fatality file	The Federal Office of Road Safety (FORS) maintain a database of all road fatalities which meet certain criteria (see "Non-trauma deaths"). Details of the database are contained in unpublished documentation which is available from FORS. See Federal Office of Road Safety (unpublished), Fatal file 1988: documentation of file structure, Canberra; Federal Office of Road Safety (unpublished), Fatality file collection 1990: Vol 1 & 2, Canberra.
Hospital morbidity collection	All States and Territories maintain information on patients admitted to hospital. They are progressively moving towards collection of a nationally agreed dataset the scope of which is detailed in the National Health Data Dictionary (1993) AIH&W, Canberra.

Hospital in-patient separation	The formal definition is "the administrative process by which a hospital records the completion of treatment and/or care and accommodation of a patient (discharge, transfer or death)" - see the National Health Data Dictionary (1993) AIH&W, Canberra.
ICD	International Classification of Diseases.
ICD9	The 9th. revision of the International Classification of Diseases.
ICD-9CM	Clinical modification of the ninth revision of the International Classification of Diseases. See Commission on professional and hospital activities (1980): the international classification of diseases, 9th revision - clinical modification, Ann Arbor.
ICD Map	Software which enables AIS codes to be mapped from ICD-9CM codes. See MacKenzie, E.J., Steinwachs, D.M. and Shankar, B. (1989). Classifying Trauma Severity Based on Hospital Discharge Diagnosis. Validation of an ICD-9CM to AIS-85 Conversion Table. Medical Care. Vol. 27, No. 4.
ISS	See "Injury Severity Score".
Injury Severity Score	The ISS is defined as the sum of the squares of the highest AIS for each of the three most severely injured body regions. It is the most widely used AIS-based measure for rating overall case severity that takes into account the combined effect of injuries to multiple body systems. For further information see Baker et al (1974) and Baker & O'Neill (1974).
Maximum AIS	Is the maximum value of the AIS for any patient. In this report, cases for which the maximum AIS was tied for two or more body regions were allocated to the 'multiple' body region category.
Mean length of stay	Is the average bed occupancy for a group of cases (ie. the total number of bed days for the group divided by the number of patients in the group). See "Bed occupancy".
Nature of injury	Refers to the details of anatomical injury coded according to chapter XVII of the International Classification of Diseases, Ninth revision, Volume 1 (1977) World Health Organisation, Geneva. (pp 473-546).
Non-trauma deaths	Are deaths in road crashes which are not due to trauma. For example, a person driving a motor vehicle who dies of a heart attack and causes the vehicle to crashes into a tree, would not be classified as a case of traumatic death. These cases are excluded from the FORS "Fatality File" and from this report.
Primary accident class	A variable in the "Fatality File" which defines the type of collision according to a standard classification (eg. "motor vehicle collision" and "non-motor vehicle collision"). It is coded only for the DCA event (see DCA). See FORS "Fatality File" for details.
Principal diagnosis	The diagnosis or condition established after study to be chiefly responsible for occasioning the admission of the patient to hospital. It is coded according to ICD-9CM in most States & Territories.
Road User type	Defines the road users use of the road at the time of injury: driver of a motor vehicle, passenger in a motor vehicle, a motorcycle rider, motorcycle passenger, pedal cyclist or pedestrian.

APPENDIX C: REFERENCES

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