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Reported Road Crashes in Western Australia: Statistics for 1996

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Abstract:
This report provides a statistical summary of reported road crashes in Western Australia for the year 1996. Trends in road crashes and casualties are examined by road user group, gender, and age groups. Several contributory factors to road crashes are also examined. Fatal and hospitalisation crashes represented only 6% of all reported crashes in 1996, but accounted for 41.5% of the costs of road crashes to the community. Alcohol, speed, fatigue and restraint wearing were all contributors to the incidence and/or severity of crashes.

Key Words:
Road Safety, Road Environment, Trends, rural, metropolitan, Road Crash, Serious Crash, Police Reported Crash, Fatality, Hospitalisation, Casualty, Injury, Road User, Vehicle Occupant, Driver, Rider, Passenger, Motorcyclist, Pedestrian, Cyclist, Inexperience, Alcohol, Speed, Fatigue, Drugs, Vehicle, Seat belt, Helmet, Protection.

Note:
This report is disseminated in the interests of information exchange

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FOREWORD

In 1996, 247 people were killed on Western Australian roads - the worst record for 15 years.

It was an appalling waste of life and made even more tragic by the fact that over one-third of those killed were under 25 years of age.

As I talk to people in the community, I find they are both angry at this senseless carnage and eager to play a part in reducing it.

Unless we can all work together to improve our road safety record, over the next five years one family in two in Western Australia will be directly affected by the trauma of a road crash, and more than one family in 12 will have a family member injured.

However, I believe 1997 is the year when Western Australia can begin to turn road trauma statistics around.

There is overwhelming support from the State Government which has established a Ministerial Council on Road Safety representing the portfolios of Transport, Health, Police, Education and Local Government.

The new Road Safety Council, representing eight key government and non-government agencies concerned with road safety, is harnessing all available community resources and expertise to tackle road safety issues.

The approach is one of education complemented by enforcement.

This book of important statistics will not only guide future directions for road safety initiatives, it will also raise community awareness of the causes of road crashes.

However, while statistics can guide the directions we take, let us not lose sight of the pain and grief behind the figures as families and friends lose their loved ones in road crashes which, for the most part, should never have happened.

Road safety is a total community responsibility and we are all called to improve our behaviour on the roads and encourage others to do likewise.

I urge you to play your part also in making Western Australia’s roads a safer place for drivers, passengers, bicyclists, motorcyclists and pedestrians.

Grant Dorrington
Independent Chair
Road Safety Council of Western Australia
MAIN FEATURES OF 1996

Reported road crashes cost the community of Western Australia an estimated $1,147 Million in 1996.

◊ The cost of rural road crashes is estimated at $335 Million.
◊ The cost of metropolitan crashes is estimated at $812 Million.

These costs represent only those road crashes that are reported to police. Many road crashes and associated casualties are not reported to police, so the actual total cost of crashes to the community is higher than these estimates.

There were 37,386 reported road crashes, resulting in:

◊ 2,592 injuries requiring hospitalisation;
◊ 8,789 injuries requiring medical treatment;
◊ 247 fatalities from 220 fatal crashes:
  • 93 motor vehicle drivers killed, the same number as in 1995;
  • 63 passengers killed, two less than in 1995;
  • 45 pedestrians killed, 16 more than in 1995;
  • 34 motorcyclists killed, 18 more than in 1995;
  • 10 bicyclists killed, five more than in 1995;
  • 1 skateboarder killed; and
  • 1 wheelchair user killed.

Features of Serious (combined Fatal and Hospitalisation) Road Crashes:

Motorcyclists were over-represented in serious crashes (11%) as they only make up 3% of registered vehicles.

62% of rural and 64% of metropolitan serious crashes occurred during daylight hours (where known).

75% of rural serious crashes involved only a single vehicle, compared with 40% of metropolitan fatal and hospitalisation crashes.

Alcohol, speed and non-use of restraints were again main features (where known):

◊ 25% of rural and 26% of metropolitan serious crashes involved a driver with a BAC of 0.05% or more.
◊ 21% of rural and 20% of metropolitan “police attended” serious crashes had speed as a suspected factor.
◊ 23% of rural and 7% of metropolitan “police attended” fatalities and hospitalisations involved persons not wearing seat belts.
MAIN FEATURES OF 1996 (cont)

Features of fatal road crashes:

57% of fatalities occurred in rural areas of the state.

76% of fatalities were male; 29% of these were aged between 17 and 24 years.

Major contributing factors to fatal road crashes included alcohol and speed. Non-use of restraints contributed to severity of injuries (where known):

◊ 26% of both rural and metropolitan drivers involved in a fatal crash had a BAC above the 0.05% legal limit.

◊ 67% of rural and 17% of metropolitan pedestrians killed had a BAC above 0.05%.

◊ 25% of rural and 40% of metropolitan fatal crashes had speed as a suspected factor.

◊ 46% of rural and 23% of metropolitan driver and passenger fatalities were not wearing seat belts.

Features of hospitalisation crashes:

39% of hospitalisation crashes occurred in rural areas of the state.

29% of road users hospitalised were in the 17-24 year age group.

Speed and alcohol were main features in hospitalisation crashes with restraint wearing a contributing factor (where known):

◊ 20% of rural and 18% of metropolitan “police attended” hospitalisation crashes had speed as a suspected factor.

◊ 23% of rural and 25% of metropolitan hospitalisation crashes involved drivers with a BAC higher than the 0.05% legal limit.

◊ 19% of rural vehicle occupants hospitalised and 7% of metropolitan vehicle occupants hospitalised were not wearing seat belts at the time of the crash.

◊ 17% of motorcyclists hospitalised in rural areas were not wearing a helmet; in metropolitan areas this figure was 8%.

◊ 22% of bicyclists hospitalised in rural areas were not wearing a helmet; in metropolitan areas this figure was 21%.
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- Road Safety Council of Western Australia
- Roadwatch. Road Accident Prevention Research Unit
- RoadWise
- Western Australian Health Department
- WA Bureau of Meteorology
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1. INTRODUCTION

This report is published annually, and is this year distributed by the Road Safety Council of Western Australia. The aim of the book is to present an overview of reported road traffic crashes in Western Australia and to highlight some of the contributing factors and major characteristics of these road crashes. All figures reported are for the 1996 calendar year. They are presented showing metropolitan and rural differences, and sometimes include additional breakdowns such as age and gender. This report provides an overview of all reported crashes, but focuses primarily on those crashes that result in fatalities and injuries requiring hospitalisation.

All crash data were obtained from the database maintained jointly by the Western Australia Police Service (WAPS) and Main Roads Western Australia (MRWA), and stored at MRWA. The data are checked for accuracy and consistency on a regular basis to ensure the reliability of any published statistics. Regular audits are also conducted to quantify error rates and identify any problems with the collection and processing of the data.

Except where indicated, all data presented in this edition were obtained from the database mentioned above. All analyses of the data were double checked to ensure accuracy in this report. It should be noted, however, that only crashes that are reported to the police are listed in the database. It is a legal requirement for all injury and serious damage crashes to be reported to police. The criteria for reporting is outlined below.

Definitions of the terms used in this publication may be found in the Glossary on page 33.

Criteria for Road Crashes

The crash data in this document are confined to those that meet the national guidelines for reporting and classifying road crashes, as defined by the Federal Office of Road Safety (FORS). The three main criteria are:

- the crash is reported to police;
- the crash occurred on a road open to and used by the public, whether the road is public or private; and
- the crash involved a vehicle which, at the time of the crash, was in motion.

Legal requirements to report road crashes

Sections 55(1) and 56(1) of the Road Traffic Act (1974) of Western Australia require a road crash to be reported to police when:

- any person is killed or injured forthwith, or
- the crash results in property damage greater than $1000.

Unfortunately, some damage and minor injury crashes are not reported to police until up to a year after the crash. The figures cited in this publication relate to crashes which occurred in 1996 and which were reported to police up to and including the 22nd August, 1997 (the date of extraction), and should be considered provisional. Future publications reporting crash statistics may report figures that vary slightly from those in this report. (MRWA data extraction: MRMSP.TAS.EXT.S01.01.96E31.12.96.)

This limitation does not apply to fatal crashes. The Federal Office of Road Safety guidelines state that, in order to be recorded as a fatal statistic, the death of a person must occur within 30 days of the crash, and be from injuries sustained in that crash.
2. CRASH AND CASUALTY TRENDS

2.1. Introduction

This section provides a comparison of Western Australia’s road toll with that of other Australian States and Territories. It also outlines some trends in Western Australia by analysing fatal road crashes, fatalities and fatality rates, casualties and all reported crashes. Associated costs to the community of these crashes are also highlighted.

While generally aware that road crashes cause many deaths, the general public tends to remain focused on disease and illness as major causes of death in Australia. The figures reported in this section suggest that road crashes are one of the major causes of death in Australia, and are therefore a significant community issue. Accordingly, road safety deserves to be given high priority by all members of the community.

2.2. Comparative Australian Fatality Rates

This comparison looks at fatality rates between all Australian States and Territories using total number of fatalities, fatality rates per 100,000 population and per 10,000 registered vehicles. According to this analysis, Western Australia had the fourth highest number of fatalities in Australia (see Figure 1), the second highest fatality rate per 100,000 population and the third highest fatality rate per 10,000 registered vehicles (2.04) (Federal Office of Road Safety, 1996). There are different travel patterns, traffic densities and road usage patterns across Australian States and Territories, however, and the differences highlighted in this analysis are difficult to assess reliably.

Figure 1: Fatalities Comparison between Australian States 1992-1996

Table 1 shows the numbers of fatalities and rates per 100,000 population for all Australian States and Territories over the past five years. During the period 1992-1995, the fatality rate per 100,000 population in Western Australia remained relatively constant (average 12.2). In 1996, this rose to 14.1, an increase of 15.5%. The highest rate per 100,000 population was in
the Northern Territory, which had a figure of 40.5, while the ACT had the lowest rate of 7.5.

TABLE 1: COMPARISON OF FATALITIES AND FATALITY RATE (PER 100,000 POPULATION) BETWEEN AUSTRALIAN STATES AND TERRITORIES (1992 TO 1996)

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WA</td>
<td>200</td>
<td>12.3</td>
<td>209</td>
<td>12.2</td>
<td>211</td>
<td>12.4</td>
<td>209</td>
<td>12.0</td>
<td>247</td>
<td>14.1</td>
</tr>
<tr>
<td>NSW</td>
<td>649</td>
<td>10.8</td>
<td>581</td>
<td>9.7</td>
<td>646</td>
<td>10.8</td>
<td>620</td>
<td>10.2</td>
<td>585</td>
<td>9.4</td>
</tr>
<tr>
<td>VIC</td>
<td>396</td>
<td>8.8</td>
<td>435</td>
<td>9.5</td>
<td>378</td>
<td>8.4</td>
<td>418</td>
<td>9.2</td>
<td>417</td>
<td>9.2</td>
</tr>
<tr>
<td>QLD</td>
<td>416</td>
<td>13.6</td>
<td>396</td>
<td>12.6</td>
<td>422</td>
<td>13.2</td>
<td>456</td>
<td>13.9</td>
<td>383</td>
<td>11.4</td>
</tr>
<tr>
<td>SA</td>
<td>165</td>
<td>11.4</td>
<td>218</td>
<td>14.8</td>
<td>163</td>
<td>11.1</td>
<td>181</td>
<td>12.3</td>
<td>181</td>
<td>12.2</td>
</tr>
<tr>
<td>TAS</td>
<td>74</td>
<td>16.1</td>
<td>58</td>
<td>12.0</td>
<td>41</td>
<td>24.0</td>
<td>61</td>
<td>35.1</td>
<td>72</td>
<td>40.5</td>
</tr>
<tr>
<td>NT</td>
<td>54</td>
<td>28.8</td>
<td>44</td>
<td>25.2</td>
<td>41</td>
<td>24.0</td>
<td>61</td>
<td>35.1</td>
<td>72</td>
<td>40.5</td>
</tr>
<tr>
<td>ACT</td>
<td>20</td>
<td>6.9</td>
<td>12</td>
<td>3.9</td>
<td>17</td>
<td>5.7</td>
<td>15</td>
<td>4.9</td>
<td>23</td>
<td>7.5</td>
</tr>
<tr>
<td>AUST</td>
<td>1974</td>
<td>11.2</td>
<td>1953</td>
<td>10.9</td>
<td>1937</td>
<td>10.9</td>
<td>2017</td>
<td>11.2</td>
<td>1972</td>
<td>10.8</td>
</tr>
</tbody>
</table>

2.3. Road Fatalities

Figure 2 shows the trend in road fatalities in Western Australia for the period 1974-1996. From 1990 to 1995, the number of fatalities on Western Australian roads remained relatively constant, but there was an increase evident in 1996. In 1996 there were 247 road fatalities in Western Australia, 38 more than in 1995. This represents an increase of 18.2%.

Table 2 shows the fatality trend for the last five years, and compares the 1996 statistics with this trend. Once again, a disturbingly high increase is evident for the current year’s statistics, with a 19.3% increase in fatalities over the five-year average.

TABLE 2: FATALITIES AND HOSPITALISATIONS, 1991-1996: 5 YEAR AVERAGE (5YA)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>207</td>
<td>200</td>
<td>209</td>
<td>211</td>
<td>209</td>
<td>207</td>
<td>247</td>
<td>+ 19.3%</td>
</tr>
<tr>
<td>Hospitalised</td>
<td>2559</td>
<td>2538</td>
<td>2568</td>
<td>2510</td>
<td>2689</td>
<td>2573</td>
<td>2592</td>
<td>+ 0.7%</td>
</tr>
<tr>
<td>Total Serious Casualties</td>
<td>2766</td>
<td>2738</td>
<td>2777</td>
<td>2721</td>
<td>2898</td>
<td>2780</td>
<td>2839</td>
<td>+ 2.1%</td>
</tr>
</tbody>
</table>
2.4. Fatal Road Crashes in Western Australia

In 1996, there were 220 fatal road crashes in Western Australia compared to 194 in 1995. This represents an increase of 13.4% in fatal road crashes over last year. Figure 3 shows the trend in fatal crashes for Western Australia since 1974 (detailed in Appendix i).

2.5. Fatality Rates

Road crash fatality rates are used as one measure of Western Australia’s road safety performance. These rates are measured in fatalities per 10,000 registered vehicles, per 100,000 population, and per 100 million vehicle kilometres travelled.

Figure 4 shows these fatality rates for Western Australia since 1974. During the period 1990-1995, these rates have remained relatively constant, but there is a slight increase in all three rates for 1996.
2.6. Road Crash Hospitalisations

The number of hospitalisations and the hospitalisation rates per 100,000 population, per registered vehicle, and per vehicle kilometre travelled all decreased slightly in Western Australia in 1996 (see Figure 5).

Figure 5 Fatality and Hospitalisation Rates 1980-1996

There were more crashes resulting in hospitalisation than in fatalities. Hospitalisation rates are therefore better overall indicators of road safety performance. While accurate records are maintained of fatal and hospitalisation crashes, some minor injuries are not treated at hospitals, and so analysis of minor injury crashes is not feasible.

Figure 5 shows a decrease of just over 10% in the number of hospitalisations that occurred due to road crashes in Western Australia in 1996 when compared to 1995. Appendix (i) provides details (where available) on death, hospitalisation, minor casualty and reported crash trends in Western Australia from 1961 to 1996. There has been a steadily declining number of casualties since the 1989 peak of 12,394 to the 1996 low of 10,244.

Analysis of hospitalisations has only been possible since 1980 when injuries began to be classified into the categories “minor” and “hospitalisation”. These rates have shown a relatively consistent decline since 1980, with a slight increase in 1995 and a return to declining numbers in 1996. These figures are used as additional indicators of WA’s road safety performance.
2.7. Total Reported Road Crashes

Since 1976, records have been kept in Western Australia on total reported road crashes. The rates for total number of reported crashes indicate similar trends to those seen in fatality rates and hospitalisation rates, shown in Figure 6. These rates peaked in 1978, and have since been showing a decline with minor fluctuations. However, there were slight increases in the per 10,000 registered vehicles category for 1995 and 1996. This increase may reflect another minor fluctuation in rates.

The number of total reported road crashes may also be used as an indicator of Western Australia’s road safety performance. However, total reported road crashes can be heavily influenced by the level of reporting of minor injury or property damage only crashes. In many cases shifts in the reporting numbers may be due to issues such as police procedures and reporting. This is one reason serious casualties and serious casualty crashes are a stronger indicator of road safety performance. In Western Australia these rates have increased in each of the last four years (see Appendix i).

2.8. Cost of 1996 Crashes

This report uses the human capital approach described in Andreassen (1992) for estimating the costs to the community of road crashes. The costs derived are based on Australian national earnings, time-use, mortality data and values of future productivity (both paid and unpaid work). Andreassen separated the costs associated with a crash into those that relate to the persons involved and those that relate to the incident itself, as shown in Table 3.
TABLE 3: EXAMPLES OF PERSON & INCIDENT COST ITEMS FOR ROAD CRASHES

<table>
<thead>
<tr>
<th>PERSON COSTS</th>
<th>INCIDENT COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• loss of present and future productivity due to premature mortality</td>
<td>• vehicle repair costs</td>
</tr>
<tr>
<td>• time losses</td>
<td>• insurance administration</td>
</tr>
<tr>
<td>• ambulance</td>
<td>• crash investigation</td>
</tr>
<tr>
<td>• medical and hospital</td>
<td>• legal fees</td>
</tr>
<tr>
<td>• rehabilitation</td>
<td>• alternate transport</td>
</tr>
<tr>
<td>• funeral</td>
<td>• traffic delay</td>
</tr>
<tr>
<td>• pain and suffering</td>
<td></td>
</tr>
</tbody>
</table>

The estimated cost of reported road crashes to the Western Australian community in 1996 was $1,147.8M, compared with $1,138M in 1995. This represents an estimated $651 for every person in Western Australia. Table 4 shows the differences between rural and metropolitan crash costs to the community. These costs show that road crashes place a considerable financial burden on Western Australians.

TABLE 4: ESTIMATED COST OF ROAD CRASHES TO THE WESTERN AUSTRALIAN COMMUNITY - A COMPARISON BETWEEN 1995 AND 1996

<table>
<thead>
<tr>
<th>RURAL</th>
<th>1996</th>
<th>WA AVERAGE INCIDENT COSTS</th>
<th>TOTAL RURAL INCIDENT COSTS</th>
<th>1995</th>
<th>WA AVERAGE INCIDENT COSTS</th>
<th>TOTAL RURAL INCIDENT COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Crashes (a)</td>
<td>6 632</td>
<td>$15 606</td>
<td>$103.5M</td>
<td>6 696</td>
<td>$15 295</td>
<td>$102.9M</td>
</tr>
<tr>
<td>Persons Involved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persons Killed</td>
<td>142</td>
<td>$695 070</td>
<td>$98.7M</td>
<td>123</td>
<td>$682 867</td>
<td>$84.0M</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>1002</td>
<td>$118 563</td>
<td>$118.8M</td>
<td>1 075</td>
<td>$117 186</td>
<td>$127.4M</td>
</tr>
<tr>
<td>Medical Treatment</td>
<td>1 453</td>
<td>$7 777</td>
<td>$11.3M</td>
<td>1 363</td>
<td>$7 650</td>
<td>$10.5M</td>
</tr>
<tr>
<td>Minor Injury</td>
<td>474</td>
<td>$844</td>
<td>$0.4M</td>
<td>504</td>
<td>$893</td>
<td>$0.5M</td>
</tr>
<tr>
<td>No Injury</td>
<td>8 658</td>
<td>$335</td>
<td>$2.9M</td>
<td>9 087</td>
<td>$334</td>
<td>$3.0M</td>
</tr>
<tr>
<td>Total Persons (b)</td>
<td>11 726</td>
<td></td>
<td>$232.1M</td>
<td>12 152</td>
<td></td>
<td>$225.4M</td>
</tr>
<tr>
<td>RURAL COSTS (a) + (b)</td>
<td></td>
<td></td>
<td>$335.6M</td>
<td></td>
<td></td>
<td>$328.3M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METROPOLITAN</th>
<th>1996</th>
<th>WA AVERAGE INCIDENT COSTS</th>
<th>TOTAL METRO INCIDENT COSTS</th>
<th>1995</th>
<th>WA AVERAGE INCIDENT COSTS</th>
<th>TOTAL METRO INCIDENT COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Crashes (c)</td>
<td>30 754</td>
<td>$15 578</td>
<td>$479.1M</td>
<td>30 591</td>
<td>$15 294</td>
<td>$467.3M</td>
</tr>
<tr>
<td>Persons Involved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persons Killed</td>
<td>105</td>
<td>$695 238</td>
<td>$73.0M</td>
<td>86</td>
<td>$682 867</td>
<td>$58.7M</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>1 590</td>
<td>$117 170</td>
<td>$186.3M</td>
<td>1 814</td>
<td>$117 186</td>
<td>$211.1M</td>
</tr>
<tr>
<td>Medical Treatment</td>
<td>7 336</td>
<td>$7 347</td>
<td>$53.9M</td>
<td>6 950</td>
<td>$7 650</td>
<td>$53.1M</td>
</tr>
<tr>
<td>Minor Injury</td>
<td>2060</td>
<td>$874</td>
<td>$1.8M</td>
<td>1 985</td>
<td>$893</td>
<td>$1.8M</td>
</tr>
<tr>
<td>No Injury</td>
<td>53 067</td>
<td>$339</td>
<td>$18.0M</td>
<td>53 422</td>
<td>$334</td>
<td>$17.8M</td>
</tr>
<tr>
<td>Total Persons (d)</td>
<td>64 056</td>
<td></td>
<td>$333.0M</td>
<td>64 257</td>
<td></td>
<td>$342.5M</td>
</tr>
<tr>
<td>METROPOLITAN COSTS (c) + (d)</td>
<td></td>
<td></td>
<td>$812.1M</td>
<td></td>
<td></td>
<td>$809.8M</td>
</tr>
</tbody>
</table>

 ESTIMATED ROAD CRASH COSTS TO THE WA COMMUNITY

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>$1 147.8M</th>
<th>1995</th>
<th>$1 138M</th>
</tr>
</thead>
</table>

Notes: Average cost is adjusted annually by the Consumer Price Index (CPI). Average costs have increased from 1995 figures, based on the Western Australian CPI annual increase of 1.8% as a 31 December 1996 (source: Australian Bureau of Statistics. Consumer Price Index. Catalogue No. 6401.0). Based on road crash costing by Andreassen (1992).
One of the most disturbing outcomes from road fatalities is the loss of people at a young age and with many years of productive life ahead. When compared with other major causes of death in Western Australia (see Table 5), it can be seen that although road crashes account for only 2% of all road deaths, they actually rob the community of almost 12% of potential life years. Road crash victims fall into every age bracket while victims of diseases such as cancer typically belong to the older age groups. If a uniform life expectancy of 70 is used, it is apparent that on average, road crash victims lose many more years of potential life.

In 1995 for example, the 209 recorded fatalities translated into approximately 7537 potential years of life lost. Although figures are not yet available for 1996, it may be assumed that the higher number of fatalities over the previous year would also mean a higher number of potential years lost.

### TABLE 5: COMPARISON BETWEEN NUMBER OF DEATHS AND POTENTIAL YEARS OF LIFE LOST FOR ALL CAUSES OF DEATH, WESTERN AUSTRALIA, 1995

<table>
<thead>
<tr>
<th>CAUSE OF DEATH</th>
<th>DEATHS</th>
<th>POTENTIAL YEARS OF LIFE LOST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>All cancers</td>
<td>2915</td>
<td>28.1</td>
</tr>
<tr>
<td>Circulatory diseases</td>
<td>4248</td>
<td>41.0</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>764</td>
<td>7.4</td>
</tr>
<tr>
<td>Digestive diseases</td>
<td>339</td>
<td>3.3</td>
</tr>
<tr>
<td>Conditions originating before birth</td>
<td>49</td>
<td>0.5</td>
</tr>
<tr>
<td>Land Transport Injuries</td>
<td>220</td>
<td>2.1</td>
</tr>
<tr>
<td>Other (injury &amp; poisoning)</td>
<td>503</td>
<td>4.8</td>
</tr>
<tr>
<td>Other (medical)</td>
<td>1321</td>
<td>12.8</td>
</tr>
<tr>
<td>Total</td>
<td>10359</td>
<td>100</td>
</tr>
</tbody>
</table>

1 Year of registration of all deaths in Western Australia (figures for 1996 not available at time of publication)
2 Potential Years Life Lost in calculated on <70 years.
Source: Mortality database, Health Information Centre, Health Department of Western Australia, 1997.

### 3. ROAD USERS

This report classifies road users involved in road crashes into different groups. These groups include any person travelling in or on a vehicle or any pedestrian involved in a collision with a road vehicle on a public road. Off-road crashes and fatalities are not included. Due to the very small number of motorcycle pillion passenger injuries in Western Australia, motorcycle riders and pillion passengers have been treated as one group in this report.

The six categories of road user are:
- Driver (motor vehicle);
- Passenger (motor vehicle);
- Motorcyclist (includes pillion passengers);
- Bicyclist;
- Pedestrian; and
- Other-Unknown (includes skateboard riders and wheelchairs).

Figure 7 shows the numbers of fatalities by road user group for the period 1991-1996. There is an apparent rising trend for the groups motorcyclists, bicyclists and pedestrians.
Appendices (ii) and (iii) present a more complete picture of road users killed and hospitalised by detailing their age groups as well as their road user group. These are divided into metropolitan and rural areas.

### 3.1. Overview

In 1996, 247 persons were killed in road crashes in Western Australia and 2592 injuries requiring hospitalisation were reported to police. The metropolitan area reported 105 fatalities and 1590 hospitalisations, while the rural areas of the state reported 142 fatalities and 1002 hospitalisations (see Table 6).

Approximately three-quarters of the Western Australian population lives in the metropolitan area (ABS, 1995). The demographic differences between metropolitan and rural areas were partially reflected by the proportion of hospitalisation casualties, with a greater number occurring in the metropolitan area. The fatality statistics, however, indicate that a disproportionate number of fatal crashes take place on rural roads, where 57.5% of fatalities occurred in 1996.

### TABLE 6: CATEGORY OF ROAD USERS KILLED AND HOSPITALISED IN 1996

<table>
<thead>
<tr>
<th>ROAD USER</th>
<th>METROPOLITAN</th>
<th>RURAL</th>
<th>STATEWIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
<td>Hospital</td>
<td>Fatal</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Driver</td>
<td>29</td>
<td>28.3</td>
<td>707</td>
</tr>
<tr>
<td>Passenger</td>
<td>13</td>
<td>12.3</td>
<td>394</td>
</tr>
<tr>
<td>Motorcyclist</td>
<td>21</td>
<td>19.8</td>
<td>203</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>9</td>
<td>8.5</td>
<td>105</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>31</td>
<td>29.2</td>
<td>177</td>
</tr>
<tr>
<td>Other *</td>
<td>2</td>
<td>1.9</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>105</strong></td>
<td><strong>100</strong></td>
<td><strong>1590</strong></td>
</tr>
</tbody>
</table>

* “Other” includes skateboarders - 1 fatality and 3 hospitalisations, and wheelchair users - 1 fatality and 1 hospitalisation.
Almost 60% of all serious casualties (including both fatalities and hospitalisations) occurred in the metropolitan area. Pedestrian fatalities outnumbered those for all other road user groups in the metropolitan area (31) closely followed by drivers (30) and motorcyclists (21). In the rural areas of Western Australia, drivers outnumbered all other road user groups with 63 deaths, while vehicle passengers accounted for 50 fatalities in 1996. Drivers and passengers together accounted for 80% of the fatalities that occurred in rural Western Australia in 1996. Drivers and passengers made up the majority of hospitalisations in both the metropolitan area (69.3%) and the rural areas (82.6%) of Western Australia.

Statewide, just over one-third (37.7%) of all fatalities were vehicle drivers, and one-quarter (25.5%) were passengers. Over 18% were pedestrians, about 14% were motorcyclists, and 4% were bicyclists.

Table 7 shows the Western Australian trends in fatalities by road user group for the period 1991-1996. While driver and passenger fatality rates have remained relatively consistent with past averages, there have been large increases in the number of fatalities experienced amongst the vulnerable road user groups of motorcyclists, bicyclists and pedestrians. This disturbing change is shown more clearly in Figure 7.

**TABLE 7: FATALITIES BY ROAD USER, 1991-1996**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>81</td>
<td>87</td>
<td>77</td>
<td>87</td>
<td>93</td>
<td>85</td>
<td>93</td>
<td>+ 9.4%</td>
</tr>
<tr>
<td>Passenger</td>
<td>59</td>
<td>78</td>
<td>62</td>
<td>58</td>
<td>66</td>
<td>65</td>
<td>63</td>
<td>- 3.2%</td>
</tr>
<tr>
<td>Motorcyclist</td>
<td>42</td>
<td>15</td>
<td>28</td>
<td>20</td>
<td>16</td>
<td>24</td>
<td>34</td>
<td>+41.7%</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>+120.0%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>17</td>
<td>19</td>
<td>37</td>
<td>38</td>
<td>29</td>
<td>28</td>
<td>45</td>
<td>+ 60.7%</td>
</tr>
<tr>
<td>Other/unknown*</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>2</td>
<td>0</td>
<td>n/a</td>
<td>2</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>207</td>
<td>200</td>
<td>209</td>
<td>211</td>
<td>209</td>
<td>207</td>
<td>247</td>
<td>+19.3%</td>
</tr>
</tbody>
</table>

* "Other/unknown" fatalities in 1994 included 2 skateboarders, in 1996 included 1 skateboarder, 1 wheelchair user.

Table 8 provides the number of serious (including both fatal and hospitalisation) crashes in Western Australia and the rate per 100,000 population in 1996. The most at risk group according to this table is vehicle drivers followed closely by passengers. There is an exceptionally high rate for pedestrians compared to previous years, which is a cause for some concern.

**TABLE 8: 1996 FATAL AND HOSPITALISATION CRASHES BY POPULATION - WESTERN AUSTRALIA**

<table>
<thead>
<tr>
<th>Road User</th>
<th>Fatal</th>
<th>Hospitalisation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>per 100 000 pop</td>
</tr>
<tr>
<td>Driver</td>
<td>93</td>
<td>5.3</td>
</tr>
<tr>
<td>Passenger</td>
<td>63</td>
<td>3.6</td>
</tr>
<tr>
<td>Motorcyclist</td>
<td>34</td>
<td>1.9</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>10</td>
<td>0.6</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>45</td>
<td>2.6</td>
</tr>
<tr>
<td>Other/Unknown*</td>
<td>2</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>247</td>
<td><strong>14.06</strong></td>
</tr>
</tbody>
</table>

* "other/unknown" fatalities included 1 skateboarder and 1 wheelchair user. Hospitalisations included 3 skateboarders and 1 wheelchair user.
3.2. Age and Gender

Both age and gender are factors in the likelihood of being involved in a road crash. For example, children younger than twelve may be more likely to be involved in pedestrian and bicycle crashes. This is partly due to the late development of factors such as peripheral vision and the cognitive ability to adequately assess risk (Pettit, 1996). Many older persons are also at higher risk of being involved in pedestrian crashes, which may be partly due to the general effects of age or disease on mobility and injury susceptibility (Wylie, 1996). Persons in these age groups (both younger and older) are less likely to be found in the category of vehicle drivers.

![Figure 8 WA Fatalities by Gender](image)

<table>
<thead>
<tr>
<th>ROAD USER</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
<td>Hospital</td>
<td>Fatal</td>
</tr>
<tr>
<td>Driver</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td></td>
<td>71</td>
<td>38.6</td>
<td>655</td>
</tr>
<tr>
<td>Passenger</td>
<td>35</td>
<td>18.7</td>
<td>374</td>
</tr>
<tr>
<td>Motorcyclist</td>
<td>33</td>
<td>17.6</td>
<td>246</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>10</td>
<td>5.3</td>
<td>112</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>36</td>
<td>19.3</td>
<td>143</td>
</tr>
<tr>
<td>Other*</td>
<td>2</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>187</td>
<td>1533</td>
<td>60</td>
</tr>
</tbody>
</table>

*Males are three times more likely to be killed in a road crash than females (Figure 9). The figures in Table 9 show information on road users killed or hospitalised by gender in 1996. Tables 9-13 refer to fatalities for each road user group by age, gender and location (rural or metropolitan). In all road user groups, more males were killed than females. In fact, males accounted for over 75% of the fatalities in Western Australia in 1996. Similarly, almost 60% of all hospitalisations were males, although female passengers outnumbered males in number of hospitalisations for that road user group (Table 9).
Hospitalisation figures similarly indicate that males account for a higher proportion than females, although to a lesser degree than for fatalities (see Figure 9). Fifty-nine percent of all hospitalisations resulting from a road crash in Western Australia in 1996 were males.

### 3.2.1. Young Adult Road Users

In 1996, a total of 2839 people were killed or hospitalised following a road crash. Of these, 808 were 17-24 year-olds. Persons in this age group make up about 13% of the Western Australian population, but were represented in over 28.5% of fatal and hospitalisation crashes in 1996 (see Table 10).

#### TABLE 10: YOUNG ADULT (AGE 17-24) FATALITIES AND HOSPITALISATIONS FOR 1996

<table>
<thead>
<tr>
<th>Road User</th>
<th>Fatality (% of total)</th>
<th>Hospitalised (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>female</td>
<td>male</td>
</tr>
<tr>
<td>Driver</td>
<td>6 (27.3%)</td>
<td>19 (26.8%)</td>
</tr>
<tr>
<td>Passenger</td>
<td>1 (3.6%)</td>
<td>12 (34.3%)</td>
</tr>
<tr>
<td>Motorcyclist</td>
<td>1 (100%)</td>
<td>15 (45.4%)</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>0 (0%)</td>
<td>2 (20%)</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>1 (11.1%)</td>
<td>6 (16.7%)</td>
</tr>
<tr>
<td>Other/unknown*</td>
<td>0 (0%)</td>
<td>1 (50%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9 (15.0%)</strong></td>
<td><strong>55 (29.4%)</strong></td>
</tr>
</tbody>
</table>

*“Other/unknown” includes one skateboarder*

Note: Figures in brackets refer to the percentage of total road user fatalities and hospitalisations represented by this age group.
Young males aged between 17 and 24 years are particularly at risk of involvement in motor vehicle crashes. This may be due to inexperience and a greater inclination to engage in risk-taking behaviours.

There does not appear to be a gender difference in the figures for 17-24 year old drivers. While the number of young males killed (19) was much higher than the number of young females killed (6), they form a similar proportion of total male and female driver fatalities (27.3% for females and 26.8% for males).

Overall 29.4% of male fatalities in Western Australia in 1996 were aged between 17 and 24. Continuing past trends, this age group is still highly over-represented in road crash statistics in Western Australia. A task force has been set up to advise the Road Safety Council of Western Australia on aspects of driver training which could be introduced to help alleviate this phenomenon.

### 3.3. Drivers

Ninety-three drivers were killed in road crashes in Western Australia in 1996 (see Table 11). This is the same number as 1995. Over one third (37.7%) of all fatalities in Western Australia in 1996 were vehicle drivers. They represented the largest number of road users killed (93) and hospitalised (1159). This is consistent with previous years.

<table>
<thead>
<tr>
<th>AGE</th>
<th>METROPOLITAN</th>
<th>RURAL</th>
<th>STATEWIDE</th>
<th>TOTAL 1996</th>
<th>TOTAL 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>12-16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>17-20</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>21-24</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>25-29</td>
<td>0</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>30-39</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>40-49</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>50-59</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>60-74</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>≥75</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>25</td>
<td>18</td>
<td>46</td>
<td>22</td>
</tr>
</tbody>
</table>
3.4. Passengers

Motor vehicle passengers represented 25.5% of fatalities in Western Australia in 1996, 30.1% of hospitalisations and 29.8% of all serious casualties. Seventy-eight percent of passenger fatalities occurred in rural Western Australia in 1996, while hospitalisations were almost evenly distributed between rural and metropolitan Western Australia (see Table 12). Passenger fatalities in Western Australia declined in 1996 to 63 from the 1995 figure of 66.

TABLE 12: PASSENGER FATALITIES BY AGE FOR 1996

<table>
<thead>
<tr>
<th>AGE</th>
<th>METROPOLITAN</th>
<th>RURAL</th>
<th>STATEWIDE</th>
<th>TOTAL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>00-04</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>05-11</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>12-16</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>17-20</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>21-24</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>25-29</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>30-39</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>40-49</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>50-59</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>60-74</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>≥75</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>8</td>
<td>23</td>
<td>27</td>
<td>28</td>
</tr>
</tbody>
</table>

3.5. Motorcyclists

There were over twice the number of motorcycle fatalities in 1996 than in 1995 (see Table 13). They represented 13.8% of all road crash fatalities, despite motorcycles only accounting for 3.1% of all registered vehicles in Western Australia.

TABLE 13. MOTORCYCLIST FATALITIES BY AGE FOR 1996

<table>
<thead>
<tr>
<th>AGE</th>
<th>METROPOLITAN</th>
<th>RURAL</th>
<th>STATEWIDE</th>
<th>TOTAL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>00-11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12-16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>17-20</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>21-24</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>25-29</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>30-39</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>40-49</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>50-59</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>60-74</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>≥75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>20</td>
<td>0</td>
<td>13</td>
<td>1</td>
</tr>
</tbody>
</table>
Over half (61.8%) of all motorcycle fatalities occurred in the metropolitan area. All rider fatalities were males, and the only pillion fatality was a female. Table 13 shows that the age group 17-24 years was once again over-represented among motorcyclist fatalities (47%). The number of fatalities in all age groups between 17 and 60 years increased in 1996.

Motorcycle riders are more exposed to risk of injury in a road crash than other motor vehicle drivers. Other drivers are protected (at least to some degree) by their vehicle and its safety features (e.g. airbags, impact bars). In addition, the handling characteristics of motorcycles are different from cars, which places a premium on rider competence, especially in unfavourable climatic or road conditions.

Approximately one percent of all road travel in Australia is by motorcycle (Morgan and Ogden, 1997). However, they accounted for 9.8% of road fatalities in the whole of Australia in 1996. Once again, the largest proportion of these deaths occurred in the 17-25 year old age group (45%) (FORS, 1996).

### 3.6. Bicyclists

The number of bicyclists killed doubled from the 1995 total of five, to 10 in 1996. Bicycle fatalities accounted for four percent of the total road deaths in 1996.

Table 14 shows bicyclist fatalities in 1996 by age group and gender. All of those killed in bicycle crashes in 1996 were male. Nine out of the ten bicycle related fatalities occurred in the metropolitan area. Half of the victims were aged less than 17 years of age, and 30% were under the age of 11. Further analysis showed that these were actually aged between 6 and 11 (see Appendix ii), i.e. primary school aged.

<table>
<thead>
<tr>
<th>AGE</th>
<th>METROPOLITAN Female</th>
<th>METROPOLITAN Male</th>
<th>RURAL Female</th>
<th>RURAL Male</th>
<th>STATEWIDE Female</th>
<th>STATEWIDE Male</th>
<th>TOTAL 1996</th>
<th>TOTAL 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-11</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>12-16</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>17-20</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>21-24</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>25-29</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>30-39</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>40-49</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>50-59</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60-74</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&gt;75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>
3.7. Pedestrians

In 1995, pedestrian fatalities accounted for almost 14% of all road deaths. This was a disturbing proportion, especially given that over 50% of these deaths occurred in the 60+ age groups. In 1996, the number of pedestrian road deaths increased 55% to 45 for the year. Of these, 44.4% were in the 60+ age groups (see Table 15). Four child pedestrians under the age of five years were also killed in 1996.

TABLE 15: PEDESTRIAN FATALITIES BY AGE FOR 1996

<table>
<thead>
<tr>
<th>AGE</th>
<th>METROPOLITAN</th>
<th>RURAL</th>
<th>STATEWIDE</th>
<th>TOTAL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>00-05</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>06-11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12-16</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>17-20</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>21-24</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>25-29</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>30-39</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>40-49</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50-59</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60-74</td>
<td>3</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>≥75</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>26</td>
<td>3</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>

The pedestrian behaviours of the very young and older members of the community that may contribute to the high fatality rates are different for the two groups. Young children lack several of the cognitive skills necessary to enable them to adequately perceive risks on the road. This is particularly true for younger children, although children up to twelve years of age may be affected (Pettit, 1996). They also lack adequate road user skills, although recent initiatives by the Western Australian Department of Education in road safety training may help to alleviate this in coming years.

Some older pedestrians are faced with different difficulties. Many of them have their mobility affected by disease or illness, and some may suffer some cognitive impairment from similar causes. Many also have vision and hearing difficulties, which adds to the difficulty of accurately assessing traffic situations such as vehicle speeds. Reaction and decision-making times are also often slower in older people.

In addition to these physical factors, the older pedestrians were raised during a time when traffic was not as heavy as it is today, nor did it travel at the same high speeds. Thirty years ago, there were 339,400 registered vehicles in Western Australia. This compares with over 1.2 million registered vehicles today.

Both older and younger age groups are more often exposed to risks as pedestrians, simply because they may spend more of their time as pedestrians than other age groups. This exposure factor cannot be ignored when examining the numbers of fatal and hospitalisation pedestrian crashes for these age groups.

The majority (35 fatalities and 217 hospitalisations) occurred in areas with a speed limit of 60-79 km/h (see Table 16). This reflects that the majority of roads in highly populated areas fall
into this range of speed limits. There were no fatalities on roads with speed limits of less than 60. The remaining 10 fatalities occurred on roads with speeds greater than 80 km/h.

### TABLE 16: PEDESTRIAN FATAL AND HOSPITALISATION CRASHES BY AREA SPEED LIMIT

<table>
<thead>
<tr>
<th>Area Speed Limit (km/h)</th>
<th>Fatal</th>
<th>Hospitalised</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60 or unknown</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>60 &amp; 70</td>
<td>35</td>
<td>217</td>
</tr>
<tr>
<td>80 &amp; 90</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>100 &amp; 110</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

More males than females were killed and hospitalised as pedestrians in 1996. Eighty percent (80%) of pedestrian fatalities and 58% of pedestrian hospitalisations were males. This may be partly due to an exposure factor, or may indicate that males of all ages engage in more risky behaviours than females (Menhennett, et.al., 1996).

#### 3.8. The Aboriginal Population

The indigenous population of Western Australia (Aboriginal and Torres Straight Islander) requires special attention when examining crash statistics. Although no recent statistics are available on the involvement of Aboriginal people in road crashes, past research has shown that they are over represented both in fatal crashes and crashes that result in hospitalisation. Cercarelli (1994) reported that Aboriginal people made up approximately 2.6% of the Western Australian population but they formed 6% of hospital discharges that were the result of road crashes between October 1987 and December 1988. Poisonings and injuries, including injuries sustained in road crashes, was found to be the second most common cause of death for Aboriginal people for the period 1977 to 1988.

Cercarelli (1994) found that crashes involving Aboriginal people were most often pedestrian or single vehicle crashes, rather than crashes that involved multiple vehicles. The areas in which crashes occurred differed for Aboriginal and Non-Aboriginal people. Over nine in ten (91.3%) single vehicle crashes involving Aboriginal people occurred in rural areas, compared to 68.6% of single vehicle crashes involving Non-Aboriginal people. This proportionally higher number of single vehicle crashes and the areas in which they occur reflects that the majority of Aboriginal people live in rural or remote areas and have greater exposure to the risk of a crash (due to greater distances travelled, and on roads with higher speed limits).

Conversely, 47.6% of pedestrian crashes involving Aboriginal people occurred in the metropolitan area. This figure suggests that Aboriginal people may be over represented in pedestrian crashes in the metropolitan area because only 26.7% of the Aboriginal population of Western Australians live in this area.

#### 4. CHARACTERISTICS OF SERIOUS CRASHES

This section highlights some of the characteristics of serious (including both fatal and hospitalisation) crashes that are identifiable from information stored on the crash database. These factors include type of crash, day of week, and road lighting conditions. Hospitalisation and fatal crashes are analysed by each of these factors, and by whether they occurred in the metropolitan area or in rural areas.
4.1. Type of Crash

Just over sixty percent (60.4%) of all metropolitan fatal and hospitalisation crashes were multi-vehicle crashes, compared to only 25.3% of rural crashes (Tables 17 & 18).

The most common type of fatal and hospitalisation, multi-vehicle crash was a right angle collision, which accounted for 41.0% of all multi-vehicle fatal and hospitalisation crashes.

TABLE 17: MULTI-VEHICLE FATAL AND HOSPITALISATION CRASHES BY CRASH TYPE AND AREA FOR 1996

<table>
<thead>
<tr>
<th>CRASH TYPE</th>
<th>RURAL</th>
<th>METROPOLITAN</th>
<th>STATEWIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
<td>Hospital</td>
<td>Fatal</td>
</tr>
<tr>
<td>Rear end</td>
<td>2</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>Head On</td>
<td>12</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>Sideswipe - Same Direction</td>
<td>6</td>
<td>27</td>
<td>5</td>
</tr>
<tr>
<td>Right angle</td>
<td>12</td>
<td>71</td>
<td>12</td>
</tr>
<tr>
<td>Indirect right angle</td>
<td>4</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>36</td>
<td>178</td>
<td>36</td>
</tr>
</tbody>
</table>

The majority (74.7%) of rural crashes were single vehicle in nature (see Table 18). The most common type of single vehicle crash was the hit object collision (44 fatal and 236 hospitalisation crashes in rural areas). The hit object collision was also the most common single vehicle fatal and hospitalisation crash statewide.

TABLE 18: SINGLE VEHICLE FATAL AND HOSPITALISATION CRASHES BY CRASH TYPE AND AREA FOR 1996

<table>
<thead>
<tr>
<th>CRASH TYPE</th>
<th>RURAL</th>
<th>METROPOLITAN</th>
<th>STATEWIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
<td>Hospital</td>
<td>Fatal</td>
</tr>
<tr>
<td>Hit pedestrian</td>
<td>14</td>
<td>68</td>
<td>31</td>
</tr>
<tr>
<td>Hit animal</td>
<td>1</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>Hit object</td>
<td>44</td>
<td>236</td>
<td>22</td>
</tr>
<tr>
<td>Non-collision</td>
<td>22</td>
<td>192</td>
<td>5</td>
</tr>
<tr>
<td>Not known</td>
<td>6</td>
<td>31</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>87</td>
<td>546</td>
<td>61</td>
</tr>
</tbody>
</table>
4.2. Day of Week

Tables 19 and 20 show fatal and hospitalisation crashes for rural and metropolitan areas broken down by the day of the week on which they occurred.

Almost 52% of fatal and hospitalisation crashes in rural areas occurred on Friday, Saturday or Sunday (Table 19). The highest number of fatal crashes (20) occurred on Thursday, Friday and Saturday and the highest number of crashes requiring hospitalisations (145) occurred on Saturday.

**TABLE 19: RURAL FATAL AND HOSPITALISATION CRASHES BY DAY OF WEEK FOR 1996**

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>MON</th>
<th>TUE</th>
<th>WED</th>
<th>THU</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>16</td>
<td>14</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>18</td>
<td>123</td>
</tr>
<tr>
<td>Hospital</td>
<td>94</td>
<td>80</td>
<td>86</td>
<td>82</td>
<td>121</td>
<td>145</td>
<td>116</td>
<td>724</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>110</td>
<td>94</td>
<td>101</td>
<td>102</td>
<td>141</td>
<td>165</td>
<td>134</td>
<td>847</td>
</tr>
<tr>
<td>Percentage</td>
<td>13.0%</td>
<td>11.1%</td>
<td>11.9%</td>
<td>12.1%</td>
<td>16.6%</td>
<td>19.5%</td>
<td>15.8%</td>
<td>100%</td>
</tr>
</tbody>
</table>

In the metropolitan area (Table 20), 48.1% of fatal and hospitalisation crashes occurred on Thursday, Friday or Saturday. The highest number of fatal crashes occurred on Saturday (24), and the highest number of crashes requiring hospitalisation occurred on Friday (231).

**TABLE 20: METROPOLITAN FATAL AND HOSPITALISATION CRASHES BY DAY OF WEEK FOR 1996**

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>MON</th>
<th>TUE</th>
<th>WED</th>
<th>THU</th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>9</td>
<td>15</td>
<td>8</td>
<td>11</td>
<td>18</td>
<td>24</td>
<td>12</td>
<td>97</td>
</tr>
<tr>
<td>Hospital</td>
<td>153</td>
<td>186</td>
<td>180</td>
<td>199</td>
<td>231</td>
<td>196</td>
<td>171</td>
<td>1316</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>162</td>
<td>201</td>
<td>188</td>
<td>210</td>
<td>249</td>
<td>220</td>
<td>183</td>
<td>1413</td>
</tr>
<tr>
<td>Percentage</td>
<td>11.5%</td>
<td>14.2%</td>
<td>13.3%</td>
<td>14.9%</td>
<td>17.6%</td>
<td>15.6%</td>
<td>12.9%</td>
<td>100%</td>
</tr>
</tbody>
</table>
4.3. Lighting Conditions

Tables 21 and 22 show rural and metropolitan fatal and hospitalisation crashes broken down by lighting conditions at the time the crash occurred. The majority of crashes occurred in daylight (62.1% rural and 63.5% metropolitan). In rural areas, 19.8% of crashes occurred at night and where no street lights were installed. In the metropolitan area, 26.1% of fatal and hospitalisation crashes occurred at night and with street lights on. These figures are comparable with 1995 crash statistics (Menhennett, et. al., 1996).

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>Daylight</th>
<th>Dawn or Dusk</th>
<th>Dark - street lights on</th>
<th>Dark - street lights off</th>
<th>Dark - no street lights</th>
<th>Unknown</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>71</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>33</td>
<td>1</td>
<td>123</td>
</tr>
<tr>
<td>Hospital</td>
<td>455</td>
<td>34</td>
<td>67</td>
<td>25</td>
<td>135</td>
<td>8</td>
<td>724</td>
</tr>
<tr>
<td>TOTAL</td>
<td>526</td>
<td>40</td>
<td>76</td>
<td>28</td>
<td>168</td>
<td>9</td>
<td>847</td>
</tr>
<tr>
<td>Percentage</td>
<td>62.1%</td>
<td>4.7%</td>
<td>9.0%</td>
<td>3.3%</td>
<td>19.8%</td>
<td>1.1%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>Daylight</th>
<th>Dawn or Dusk</th>
<th>Dark - street lights on</th>
<th>Dark - street lights off</th>
<th>Dark - no street lights</th>
<th>Unknown</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>50</td>
<td>3</td>
<td>34</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>97</td>
</tr>
<tr>
<td>Hospital</td>
<td>847</td>
<td>68</td>
<td>335</td>
<td>20</td>
<td>37</td>
<td>9</td>
<td>1316</td>
</tr>
<tr>
<td>TOTAL</td>
<td>897</td>
<td>71</td>
<td>369</td>
<td>21</td>
<td>46</td>
<td>9</td>
<td>1413</td>
</tr>
<tr>
<td>Percentage</td>
<td>63.5%</td>
<td>5.0%</td>
<td>26.1%</td>
<td>1.5%</td>
<td>3.3%</td>
<td>0.6%</td>
<td>100%</td>
</tr>
</tbody>
</table>

5. MAJOR CONTRIBUTING FACTORS

This section identifies some of the main factors which are identifiable from the crash database as having contributed to serious (including both fatal and hospitalisation) crashes. There are three main categories of factors which contribute to road crashes: Human factors, Road Environment factors, and Vehicle factors (see Table 23). These factors sometimes contribute to a crash independently of other factors, but more often interact to contribute to the cause of crashes. The Human factors include inexperience, alcohol and drug-taking, fatigue, speed, and restraint use. Road environment factors include road alignment, gradient, surface, and condition. Vehicle factors discussion includes type of vehicle involved in fatal and hospitalisation crashes, and some vehicle safety features are outlined.

5.1. Overview

The most common causal factor falls into one or another of the Human factors types. It is believed that up to 95% of all crashes have human factors as at least a partial cause. Road Environment factors account for about 28%, and Vehicle factors account for only about 4% of
road crashes in combination with other Human and Environment factors. Figure 11 shows the interaction of these factors.

**TABLE 23: CONTRIBUTING FACTORS TO ROAD CRASHES**

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>HUMAN</th>
<th>ROAD ENVIRONMENT</th>
<th>VEHICLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-CRASH</td>
<td>• inexperience</td>
<td>• road surfaces</td>
<td>• tyre blow-outs</td>
</tr>
<tr>
<td></td>
<td>• alcohol</td>
<td>• poor signs</td>
<td>• mechanical failures</td>
</tr>
<tr>
<td></td>
<td>• drug use</td>
<td>• poor signals</td>
<td>• braking failures</td>
</tr>
<tr>
<td></td>
<td>• driver fatigue</td>
<td>• delineation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• excessive speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRASH</td>
<td>• seat-belts</td>
<td>• trees, poles</td>
<td>• fitment of seat belts</td>
</tr>
<tr>
<td></td>
<td>• child restraints</td>
<td>• ditches</td>
<td>• design of interior</td>
</tr>
<tr>
<td></td>
<td>• helmet wearing</td>
<td>• soft roadside verges</td>
<td>• rollover strength</td>
</tr>
<tr>
<td>POST-CRASH</td>
<td>• degree of injury</td>
<td>• lack of barriers</td>
<td>• passenger safety design</td>
</tr>
<tr>
<td></td>
<td>• no assistance at crash scene</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• lack of first aid knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• non-use of vehicle hazard lights</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| SOURCE: Menhennett, et.al., 1996

Figure 11: Factors contributing to road crashes

\[\text{Human factors (95\%)} \cap \text{Road Environment factors (28\%)} \cup \text{Vehicle factors (4\%)}\]

5.2. **Human Factors**

5.2.1. **Inexperience**

In the 1996 statistics, as in previous years, the age group 17-24 are grossly over-represented in the fatal and hospitalisation crash figures. This may be a reflection of their relative inexperience as drivers. This pattern is not unique to Australia, having been reported in numerous countries around the world including Sweden (Gregerson, 1994), and the USA.
(Massie, Campbell & Williams, 1995). Persons in this age group make up about 20% of all licensed drivers, but they comprise 27% of driver fatalities.

It is often believed that drivers in this age group are prone to over-estimating their ability to control a vehicle in some conditions, and that they may underestimate risks. Personality and lifestyle are also cited as contributors to crashes among younger drivers (Berg, 1994).

### 5.2.2. Role of Alcohol

It is known that the risk of being involved in a crash increases with the amount of alcohol consumed (Ryan, Ferrante, Loh & Cercarelli, 1996). Surveys have shown that males consume more alcohol than females in Australia.

The Blood Alcohol Content (BAC) was unknown or not recorded in 70.3% of “police attended” crashes. This may be due to the fact that it is not compulsory for individuals hospitalised as a result of a road crash to take a blood alcohol test. In cases where injuries are severe, BAC may not be tested until hours after the crash as it is not a high priority when lives are at risk. The figures for the highest BAC levels recorded in drivers (including motorcyclists) involved in fatal crashes are shown in Table 24.

**TABLE 24: DRIVERS OR RIDERS INVOLVED IN FATAL CRASHES INVOLVING HIGHEST BAC BY AREA FOR 1996**

<table>
<thead>
<tr>
<th>AREA</th>
<th>NIL UNDER 0.05%</th>
<th>0.05% - 0.079%</th>
<th>0.08% - 0.149%</th>
<th>≥0.15%</th>
<th>SUB TOTAL</th>
<th>UN-KNOWN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>74</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>24</td>
<td>112</td>
<td>11</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>58</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>18</td>
<td>90</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>132</td>
<td>13</td>
<td>4</td>
<td>11</td>
<td>42</td>
<td>202</td>
<td>18</td>
</tr>
</tbody>
</table>

In the metropolitan area, 25.8% of drivers involved in a fatal crash (where BAC was recorded) had a BAC of greater than the legal limit of 0.05%. In rural areas, this figure was 26%. There was roughly equal proportion of rural and metropolitan drivers involved in fatal crashes with a BAC of greater than 0.05%.

Pedestrian fatalities are also tested for alcohol consumption during post mortem examination. In Western Australia in 1996, 28.9% of pedestrians killed (or 13 of 45 deaths) had a BAC of greater than 0.05%. A higher proportion of these were in rural areas (8 of 13 fatalities) (see Table 25).

**TABLE 25: “POLICE ATTENDED” FATAL AND HOSPITALISATION CRASHES BY AREA INVOLVING HIGHEST BAC FOR PEDESTRIAN FOR 1996**

<table>
<thead>
<tr>
<th>AREA</th>
<th>NIL UNDER 0.05%</th>
<th>0.05%-0.079%</th>
<th>0.08%-0.149%</th>
<th>≥0.15%</th>
<th>SUB TOTAL</th>
<th>UN-KNOWN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>12</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>hospitalisation</td>
<td>78</td>
<td>6</td>
<td>1</td>
<td>11</td>
<td>11</td>
<td>107</td>
<td>369</td>
</tr>
<tr>
<td>Metropolitan</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>29</td>
<td>2</td>
</tr>
<tr>
<td>hospitalisation</td>
<td>105</td>
<td>8</td>
<td>8</td>
<td>23</td>
<td>14</td>
<td>158</td>
<td>507</td>
</tr>
<tr>
<td>TOTAL</td>
<td>209</td>
<td>16</td>
<td>10</td>
<td>35</td>
<td>36</td>
<td>306</td>
<td>880</td>
</tr>
</tbody>
</table>

**TABLE 26: DRIVERS AND RIDERS INVOLVED IN “POLICE ATTENDED” FATAL AND HOSPITALISATION CRASHES WITH HIGHEST BAC BY AGE FOR 1996**
## Counter Measures

Random Breath Testing was first introduced in Western Australia in October, 1988. In 1993, the current 0.05% Blood Alcohol Content legislation was introduced. Over the five-year period 1991-1996, trends show that more drivers are tested each year (see Table 27). In general, more drivers are charged each year, with the exception of 1993, which experienced a decrease in the number of charges in both rural and metropolitan areas. Overall, the proportion of drivers charged in rural areas has remained relatively constant during the last five years.

In the metropolitan area, there was a decreasing trend in the number of drivers stopped and tested until 1995, when it increased by 0.5%. Note that the figures in Table 27 do not include those stopped and tested by “Booze Buses”, whose activity levels are increasing in Western Australia.

Two “Booze Buses” were purchased by the SGIC in 1995. This has helped to increase the number of drivers stopped and tested for alcohol. The Road Safety Council of Western Australia has set up a Road Safety Task Force on Alcohol and Drugs as part of its integrated framework for the effective improvement of the state’s road safety record.

### TABLE 27: RANDOM BREATH TESTING OF DRIVERS 1991-1996

<table>
<thead>
<tr>
<th>YEAR</th>
<th>VEHICLES STOPPED</th>
<th>CHARGES</th>
<th>% STOP CHARGED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metro Rural State wide</td>
<td>Metro Rural State wide</td>
<td>Metro Rural State wide</td>
</tr>
<tr>
<td>1991</td>
<td>416 550 262 664 679 214</td>
<td>2 077 2 974 5 051</td>
<td>0.5 1.1 0.7</td>
</tr>
<tr>
<td>1992</td>
<td>451 447 253 392 704 839</td>
<td>1 519 3 333 4 852</td>
<td>0.3 1.3 0.7</td>
</tr>
<tr>
<td>1993</td>
<td>469 200 300 294 769 494</td>
<td>1 465 3 017 4 482</td>
<td>0.3 1.0 0.6</td>
</tr>
<tr>
<td>1994</td>
<td>382 011 289 588 671 599</td>
<td>2 876 3 304 6 180</td>
<td>0.8 1.1 0.9</td>
</tr>
<tr>
<td>1995</td>
<td>282 167 278 001 560 168</td>
<td>3 672 3 262 6 934</td>
<td>1.3 1.2 1.2</td>
</tr>
<tr>
<td>1996*</td>
<td>249 553 255 248 504 801</td>
<td>2 770 3 243 6 013</td>
<td>1.1 1.3 1.2</td>
</tr>
</tbody>
</table>

*Note: 1996 RBT figures are yet to be audited. Figures do not include “Booze Buses”. “Booze Bus” figures were not available at the time of publication. SOURCE: WAPS R&D (1997)

### 5.2.3. Drugs

The data for this section were obtained from the Chemistry Centre at the Western Australian Department of Minerals and Energy. Drugs other than alcohol were detected in slightly over

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**Reported Road Crashes in WA: Statistics for 1996**

Road Safety Council of Western Australia
25% of all road fatalities, which is an increase of 10% from 1995. Cannabis was the most commonly detected drug, being present in 36 fatalities, and in 23 (12.5%) of these the amount detected was at a significant level. Other categories of drugs were present in 7.6% of road fatalities, and in 1.7% at a significant level. The levels provided here are significant are those at which some level of general impairment is likely in most people. Table 28 shows a breakdown of the frequencies with which various groups of drugs were detected in 1996 road fatalities. Please note, Table 28 does not include figures for passenger fatalities, as drug levels in passengers would not have any influence on the occurrence of the crash.

**TABLE 28: DRUGS DETECTED IN 1996 ROAD FATALITIES**

<table>
<thead>
<tr>
<th>ROAD USER</th>
<th>Cannabis</th>
<th>Opiates</th>
<th>Benzo-diazepines</th>
<th>Amphetamines</th>
<th>TOTAL FATALITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Driver</td>
<td>9</td>
<td>15</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Motorcycle Rider</td>
<td>7</td>
<td>12</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>6</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>23</strong></td>
<td><strong>36</strong></td>
<td><strong>0</strong></td>
<td><strong>5</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td>% of above Fatalities</td>
<td>12.5</td>
<td>19.7</td>
<td>0</td>
<td>2.7</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Note: Cases where a drug was known to have been administered as emergency medication have not been included in the above table.

Column A indicates the number of cases in which each drug was present at a significant level.

Column B indicates the total number of cases in which the drug was detected.

Total Fatalities includes all fatalities in each road user group.

Source: Chemistry Centre, Western Australian Department of Minerals and Energy, 1997

5.2.4. Fatigue

Fatigue as a factor in road crashes is often difficult to identify. That it exists as a factor is beyond question, especially in rural areas of Western Australia where distances between stops can be quite large. Single vehicle crashes are those most often identified as having a fatigue factor, especially if they occur on open roads at high risk times for such crashes (e.g. between 10PM and 6AM).

There are several situations in which fatigue can affect drivers of motor vehicle, identified by Hartley (1996). Persons who may be affected include:

- those who drive for a living (e.g. taxi, courier, bus and truck drivers);
- those with some medical conditions (e.g. narcolepsy, obesity), especially those taking medication;
- those who have not had adequate rest and/or sleep before a journey;
- those who have consumed alcohol; and/or
- those on a fixed schedule or under time pressure to complete their journey (e.g truck drivers).

Fatigue can hamper effective cognitive functioning and, in extreme cases, fatigue can cause the brain to cease functioning involuntarily. This means that regardless of determination or professionalism, fatigue can have potentially serious effects on all drivers.
Given the potentially serious effects of fatigue on drivers, especially in rural areas, the Western Australian government has introduced countermeasures to combat the problem. These measures are described below, but cannot completely eradicate the problem of fatigue. This can only be done through responsible driving behaviour: all drivers should remain aware of the contributors to fatigue, and utilise the countermeasures available to them.

**Driver Reviver**

The Driver Reviver program aims to reduce fatigue related crashes throughout peak periods of travel, predominantly during the Easter and Christmas holiday periods when traffic volume and crashes are traditionally high. Drivers of vehicles are stopped and given free coffee and chocolate. Each stop is staffed by a volunteer team comprising local Police, service clubs, community groups and concerned members of the public.

Driver Reviver operated from eleven (11) locations at various times throughout 1996. 15,000 disposable coffee cups were ordered by the participating stops. A similar number of free chocolates were provided to the stops.

The program is currently being extended to incorporate an increase in the number of Driver Reviver stops, provision of facilitated rest areas, signage (provided by MRWA) and the community awareness/acceptance of the program.

**Coffee Stop**

The Coffee Stop program was initiated in 1993 and aims to reduce driver fatigue and fatigue related crashes in rural Western Australia. The program provides the drivers of vehicles with a free cup of coffee as a sit down service.

113 roadhouses were actively participating in the program at the end of 1996. Roadhouses are issued with a quantity of promotional material (to be increased in 1997/98). Roadside signs are erected 500 metres either side of participating roadhouses to inform the public of the service. These signs are provided and maintained by MRWA.

**Road Safety Task Force on Fatigue Management**

The State Government has set up this Task Force to develop strategies to combat fatigue in Western Australian drivers. The output of this task force to date includes the development of a strategic framework for fatigue management, as well as creating a research plan for the topic. Plans for 1997 include:

- Release an issues and directions paper on fatigue management;
- Develop a strategic research plan and obtain funding; and
- Produce a strategic plan for tackling driver fatigue in Western Australia in the medium to long term, but specifically in the next twelve months.
5.2.5. Speed

Speed was found to be a factor in 16.9% of rural “police attended” crashes and 17.7% of metropolitan “police attended” crashes. In rural areas, speed was a suspected factor in 24.6% of fatal crashes, the corresponding figure for the metropolitan area was 40.2% (see Tables 29 and 30). Speed is considered to be a factor in the crash if at least one of the vehicles involved was travelling at high speed at the time of the crash; the judgement is made by police attending the crash.

TABLE 29: RURAL “POLICE ATTENDED” ROAD CRASHES WHERE SPEED WAS A SUSPECTED FACTOR FOR 1996

<table>
<thead>
<tr>
<th>Speed a Factor</th>
<th>Speed Not a Factor</th>
<th>Unknown</th>
<th>Total “Police Attended” Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>Rural</td>
</tr>
<tr>
<td>Fatal</td>
<td>30 24.6</td>
<td>78 63.9</td>
<td>14 11.5</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>111 18.6</td>
<td>445 74.4</td>
<td>42  7.0</td>
</tr>
<tr>
<td>Medical Attention-not in Hospital</td>
<td>55 11.1</td>
<td>416 84.2</td>
<td>23  4.7</td>
</tr>
<tr>
<td>Medical Attention not Required</td>
<td>18 15.9</td>
<td>90 79.7</td>
<td>5  4.4</td>
</tr>
<tr>
<td>Property Damage Only</td>
<td>182 17.9</td>
<td>778 76.6</td>
<td>56 5.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>396 16.9</strong></td>
<td><strong>1807 77.1</strong></td>
<td><strong>140 6.0</strong></td>
</tr>
</tbody>
</table>

TABLE 30: METROPOLITAN “POLICE ATTENDED” ROAD CRASHES WHERE SPEED WAS A SUSPECTED FACTOR FOR 1996

<table>
<thead>
<tr>
<th>Speed a Factor</th>
<th>Speed Not a Factor</th>
<th>Unknown</th>
<th>Total “Police Attended” Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>Metropolitan</td>
</tr>
<tr>
<td>Fatal</td>
<td>39  40.2</td>
<td>54 55.7</td>
<td>4  4.1</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>190 16.7</td>
<td>850 74.8</td>
<td>96 8.5</td>
</tr>
<tr>
<td>Medical Attention-not in Hospital</td>
<td>176 10.9</td>
<td>1325 82.4</td>
<td>108 6.7</td>
</tr>
<tr>
<td>Medical Attention not Required</td>
<td>57  19.6</td>
<td>215 73.9</td>
<td>19  6.5</td>
</tr>
<tr>
<td>Property Damage Only</td>
<td>541 21.4</td>
<td>1771 70.1</td>
<td>216 8.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1003 17.7</strong></td>
<td><strong>4215 74.5</strong></td>
<td><strong>443 7.8</strong></td>
</tr>
</tbody>
</table>

A breakdown of the types of vehicles involved in crashes in which speed was a factor, and the speed zone in which crashes occurred is shown in Table 31. Motorcycles are over represented here, with 23 out of 34 (67.6%) motorcycle fatalities occurring in crashes in which speed was a factor. However, it cannot be assumed that in each case the motorcycle was necessarily the speeding vehicle as the database does not specify which vehicle in a crash was thought to be exceeding the speed limit.

The majority of fatalities and hospitalisations in which speed was a factor in the crash occurred in speed limit areas of 60 or 70 km/h (34 fatalities and 223 hospitalisations). This may reflect higher traffic volumes on roads in this speed limit range.
TABLE 31: FATALITIES AND HOSPITALISATIONS FOR CRASHES IN WHICH SPEED WAS A FACTOR BY VEHICLE TYPE AND AREA SPEED LIMIT - 1996

<table>
<thead>
<tr>
<th>Vehicle/ Road User Type</th>
<th>Area Speed Limit (km/h)</th>
<th>&lt; 60 or u/k</th>
<th>60 &amp; 70</th>
<th>80 &amp; 90</th>
<th>100&amp; 110</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>fatal</td>
<td>hosp</td>
<td>fatal</td>
<td>hosp</td>
</tr>
<tr>
<td>Sedan/ hatchback</td>
<td></td>
<td>1</td>
<td>6</td>
<td>11</td>
<td>134</td>
</tr>
<tr>
<td>Station Wagon</td>
<td></td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Utility</td>
<td></td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Panel Van, 4WD</td>
<td></td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Rigid Truck</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Bus (12 or more occupants)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Multi Seater Van</td>
<td></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Motorcycle</td>
<td></td>
<td>1</td>
<td>2</td>
<td>15</td>
<td>44</td>
</tr>
<tr>
<td>Articulated Truck</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Pedestrian</td>
<td></td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Bicyclist</td>
<td></td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Other/not known</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2</strong></td>
<td><strong>20</strong></td>
<td><strong>34</strong></td>
<td><strong>223</strong></td>
</tr>
</tbody>
</table>

5.2.6. Vehicle Occupant and Other Road User Protection

Almost all (98%) of respondents in a national survey carried out by the Federal Office of Road Safety reported that they “always” or nearly always” wore seat belts in the front seat of a car and 93% reported that they “always” or “nearly always” wore seat belts in the back seat (Mitchell-Taverner, Adams & Hejtmanek, 1996). Tables 32 and Table 33 show that a disproportionate number of people killed in “police attended” car crashes were not wearing seat belts at the time of the crash (these figures are based on cases where this information was known). In rural areas, 40.7% of drivers and 52.3% of passengers killed were not wearing seat belts; while in the metropolitan area these figures are, 18.5% of drivers and 30.8% of passengers.

TABLE 32: RURAL VEHICLE OCCUPANT RESTRAINT WEARING RATES (“POLICE ATTENDED” FATAL AND HOSPITALISATION CRASHES) - 1996

<table>
<thead>
<tr>
<th>ROAD USER</th>
<th>Injury Severity</th>
<th>Worn</th>
<th>Not Worn</th>
<th>Failed</th>
<th>Not Known (1)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Driver</td>
<td>Fatality</td>
<td>31</td>
<td>57.4</td>
<td>22</td>
<td>40.7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>299</td>
<td>86.7</td>
<td>46</td>
<td>13.3</td>
<td>0</td>
</tr>
<tr>
<td>Passenger</td>
<td>Fatality</td>
<td>21</td>
<td>47.7</td>
<td>23</td>
<td>52.3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>194</td>
<td>73.2</td>
<td>70</td>
<td>26.4</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>545</td>
<td>77.0</td>
<td>161</td>
<td>22.7</td>
<td>2</td>
</tr>
</tbody>
</table>

Notes: (1) Cooper (1994) indicates the ‘not known’ data are ‘notoriously biased’ in over-estimating seat belt wearing.
TABLE 33: METROPOLITAN VEHICLE OCCUPANT RESTRAINT WEARING RATES
(“POLICE ATTENDED” FATAL AND HOSPITALISATION CRASHES) - 1996

<table>
<thead>
<tr>
<th>ROAD USER</th>
<th>Injury Severity</th>
<th>Worn</th>
<th>Not Worn</th>
<th>Failed</th>
<th>Not Known (1)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Driver</td>
<td>Fatality</td>
<td>21</td>
<td>77.8</td>
<td>5</td>
<td>18.5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>505</td>
<td>94.9</td>
<td>25</td>
<td>4.7</td>
<td>2</td>
</tr>
<tr>
<td>Passenger</td>
<td>Fatality</td>
<td>9</td>
<td>69.2</td>
<td>4</td>
<td>30.8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>266</td>
<td>89.9</td>
<td>30</td>
<td>10.1</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>801</td>
<td>92.3</td>
<td>64</td>
<td>7.4</td>
<td>3</td>
</tr>
</tbody>
</table>

Notes: (1) Cooper (1994) indicates the ‘not known’ data are ‘notoriously biased’ in over-estimating seat belt wearing.

Haworth and Schulze (1996) report the results of a number of studies whose findings suggest that wearing a helmet on a motorcycle can significantly reduce the number and severity of injuries sustained in a motorcycle crash. This study also highlights the findings of a study conducted in New South Wales that found helmet wearing rates to be 97.4% for riders and 96% for pillions. Tables 34 and 35 show the helmet wearing rates for rural and metropolitan fatal and hospitalisation motorcycle crashes. These tables show that a higher than expected percentage of motorcycle riders were not wearing a helmet at the time of the crash based on the results of the NSW survey (30.8% for rural and 20.0% for metropolitan).

Tables 34 and 35 also show the helmet wearing rate for bicyclists involved in fatal and hospitalisation crashes in rural and metropolitan areas. In the metropolitan areas over half (55.6%) of bicyclists killed in 1996 were not wearing helmets.

TABLE 34: HELMET WEARING RATES IN RURAL CRASHES - 1996

<table>
<thead>
<tr>
<th>ROAD USER</th>
<th>Injury Severity</th>
<th>Worn</th>
<th>Not Worn</th>
<th>Not Known</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Motorcyclist (&amp; mops)</td>
<td>Fatality</td>
<td>9</td>
<td>69.2</td>
<td>4</td>
<td>30.8</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>45</td>
<td>77.6</td>
<td>13</td>
<td>22.4</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>Fatality</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>11</td>
<td>64.7</td>
<td>6</td>
<td>35.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>66</td>
<td>74.2</td>
<td>23</td>
<td>25.8</td>
</tr>
</tbody>
</table>

TABLE 35: HELMET WEARING RATES IN METROPOLITAN CRASHES - 1996

<table>
<thead>
<tr>
<th>ROAD USER</th>
<th>Injury Severity</th>
<th>Worn</th>
<th>Not Worn</th>
<th>Not Known</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Motorcyclist (&amp; mops)</td>
<td>Fatality</td>
<td>16</td>
<td>80.0</td>
<td>4</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>147</td>
<td>89.6</td>
<td>17</td>
<td>10.4</td>
</tr>
<tr>
<td>Bicyclist</td>
<td>Fatality</td>
<td>4</td>
<td>44.4</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td>Hospitalised</td>
<td>63</td>
<td>74.1</td>
<td>22</td>
<td>25.9</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>230</td>
<td>82.7</td>
<td>48</td>
<td>17.3</td>
</tr>
</tbody>
</table>
5.3. Road Environment

This section outlines details of the reported road environment factors for all serious (including both fatal and hospitalisation) road crashes. The factors which are identifiable from the crash database include road alignment, gradient, surface, wet or dry conditions and road lighting.

Road environment factors contribute to about 28% of road crashes in combination with Human and Vehicle factors, and they are thought to contribute more to crash severity than direct cause. This is because the environment surrounding a road (particularly in rural areas) may have potentially serious consequences for a vehicle and its occupants after it has been involved in a collision.

5.3.1. Road Alignment

Tables 36 and 37 show rural and metropolitan fatal and hospitalisation crashes by the alignment of the road on which they occurred. The majority (69.6% rural and 81.7% metropolitan) of fatal and hospitalisation crashes occurred on straight sections of road.

**TABLE 36: ROAD ALIGNMENT - RURAL AREA FATAL AND HOSPITALISATION CRASHES FOR 1996**

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD ALIGNMENT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CURVED</td>
<td>STRAIGHT</td>
</tr>
<tr>
<td>Fatal</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>224</td>
<td>499</td>
</tr>
<tr>
<td>TOTAL</td>
<td>256</td>
<td>590</td>
</tr>
<tr>
<td>Percentage</td>
<td>30.2%</td>
<td>69.6%</td>
</tr>
</tbody>
</table>

**TABLE 37: ROAD ALIGNMENT - METROPOLITAN AREA FATAL AND HOSPITALISATION CRASHES FOR 1996**

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD ALIGNMENT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CURVED</td>
<td>STRAIGHT</td>
</tr>
<tr>
<td>Fatal</td>
<td>21</td>
<td>75</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>232</td>
<td>1079</td>
</tr>
<tr>
<td>TOTAL</td>
<td>253</td>
<td>1154</td>
</tr>
<tr>
<td>Percentage</td>
<td>17.9%</td>
<td>81.7%</td>
</tr>
</tbody>
</table>
5.3.2.  Road Gradient

It is not possible to make statements about a causal relationship between road gradient and fatal and hospitalisation crashes, as the information provided by the Police database does not remove confounding factors such as the presence of an intersection, and there is limited research available on exposure factors. The majority of rural and metropolitan crashes occurred on level sections of road (74.1% and 76.5% respectively) (see Tables 38 and 39). The percentages of crashes occurring on sloped sections of road are 20.3% for rural areas, and 18.7% for the metropolitan area. These figures are comparable with those for 1995 serious crashes (Menhennett et. al., 1996).

### TABLE 38: ROAD GRADIENT - RURAL FATAL AND HOSPITALISATION CRASHES FOR 1996

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD ALIGNMENT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LEVEL</td>
<td>CREST</td>
</tr>
<tr>
<td>Fatal</td>
<td>89</td>
<td>7</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>539</td>
<td>36</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>628</td>
<td>43</td>
</tr>
<tr>
<td>Percentage</td>
<td>74.1%</td>
<td>5.1%</td>
</tr>
</tbody>
</table>

### TABLE 37: ROAD GRADIENT - METROPOLITAN FATAL AND HOSPITALISATION CRASHES FOR 1996

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD ALIGNMENT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LEVEL</td>
<td>CREST</td>
</tr>
<tr>
<td>Fatal</td>
<td>78</td>
<td>3</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>1003</td>
<td>56</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1081</td>
<td>59</td>
</tr>
<tr>
<td>Percentage</td>
<td>76.5%</td>
<td>4.2%</td>
</tr>
</tbody>
</table>

5.3.3.  Road Surface

In rural areas 26% of roads are sealed (Menhennett, et.al., 1996), yet 79.3% of fatal and hospitalisation crashes in 1996 occurred on sealed stretches of road (Table 40). It should be noted that this may be an effect of heavier traffic volumes on sealed roads.

### TABLE 40: ROAD SURFACE - RURAL AREA FATAL AND HOSPITALISATION CRASHES FOR 1996

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD SURFACE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SEALED</td>
<td>UNSEALED</td>
</tr>
<tr>
<td>Fatal</td>
<td>103</td>
<td>20</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>569</td>
<td>154</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>672</td>
<td>174</td>
</tr>
<tr>
<td>Percentage</td>
<td>79.3%</td>
<td>20.5%</td>
</tr>
</tbody>
</table>
Ninety-nine percent of metropolitan roads are sealed (Menhennett, et.al., 1996). It is therefore not surprising that 98.8% of metropolitan fatal and hospitalisation crashes occurred on sealed roads (Table 41).

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD SURFACE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SEALED</td>
<td>UNSEALED</td>
</tr>
<tr>
<td>Fatal</td>
<td>97</td>
<td>0</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>1299</td>
<td>13</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1396</td>
<td>13</td>
</tr>
<tr>
<td>Percentage</td>
<td>98.8%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

### 5.3.4. Road Conditions - Weather

In 1996, 12.7% of rural and 20.2% of metropolitan fatal and hospitalisation crashes occurred in wet conditions (see Tables 42 and 43). This represents an increase from 1995 of 1.2 and 0.8 percentage points respectively. In 1996, most regions of Western Australia received average to above average rainfall, with Perth experiencing 129 wet days (average 116 days) and 889 mm of rain (average 801 mm) (Bureau of Meteorology, 1997, unpublished data).

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD CONDITION</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WET</td>
<td>DRY</td>
</tr>
<tr>
<td>Fatal</td>
<td>19</td>
<td>104</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>89</td>
<td>634</td>
</tr>
<tr>
<td>TOTAL</td>
<td>108</td>
<td>738</td>
</tr>
<tr>
<td>Percentage</td>
<td>12.7%</td>
<td>87.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRASH SEVERITY</th>
<th>ROAD CONDITION</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WET</td>
<td>DRY</td>
</tr>
<tr>
<td>Fatal</td>
<td>15</td>
<td>82</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>270</td>
<td>1042</td>
</tr>
<tr>
<td>TOTAL</td>
<td>285</td>
<td>1124</td>
</tr>
<tr>
<td>Percentage</td>
<td>20.2%</td>
<td>79.5%</td>
</tr>
</tbody>
</table>
5.4. Vehicle and Equipment Factors

5.4.1. Vehicles Involved in Crashes

The most common type of vehicle involved in reported crashes was a passenger car (see Table 44). These vehicles compose 72.7% of registered vehicles and were involved in 58.4% of reported fatal and hospitalisation crashes. Motorcycles are over represented, comprising only 3.1% of registered vehicles, yet being involved in 12.9% of fatal and hospitalisation crashes. This is an increase from 1995 where motorcycles formed a similar component of registered vehicles, and were involved in 8% of fatal and hospitalisation crashes (Menhennett, et.al.,1996).

This over representation of motorcycles can be attributed to two main factors. The first is that motorcycles are more likely to become involved in road crashes, due to a lack of conspicuity, and a lack of public awareness. In a report published by the Monash University Accident Research Centre (MUARC) it was highlighted that “most multi-vehicle motorcycle crashes result from an automobile driver violating the motorcyclist’s right of way” (Haworth & Schulze, 1996, 13). The second factor is that when a motorcyclist becomes involved in a crash, the injuries sustained by the rider are likely to be more severe than those sustained by a car driver, due to the motorcycle rider’s lack of protection from external factors (Haworth & Schulze, 1996). The MUARC study suggests that riders wearing reflective clothing and making use of daytime running lights has the potential to improve rider visibility and therefore reduce the number of crashes that occur. Improvements in helmet design, protective clothing and systems for motorcycles such as anti-lock brake systems, may reduce the severity of crashes that occur.

<table>
<thead>
<tr>
<th>VEHICLE TYPE</th>
<th>CRASH SEVERITY</th>
<th>VEHICLES IN FATAL AND HOSPITALISATION CRASHES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Crashes</td>
<td>Fatal</td>
</tr>
<tr>
<td>Sedan/Hatchback</td>
<td>51493</td>
<td>102</td>
</tr>
<tr>
<td>Station Wagon</td>
<td>7513</td>
<td>7</td>
</tr>
<tr>
<td>Utility</td>
<td>5806</td>
<td>17</td>
</tr>
<tr>
<td>Panel Van, 4WD</td>
<td>3338</td>
<td>21</td>
</tr>
<tr>
<td>Rigid Truck</td>
<td>1503</td>
<td>0</td>
</tr>
<tr>
<td>Articulated Truck</td>
<td>363</td>
<td>2</td>
</tr>
<tr>
<td>Bus (12 or more</td>
<td>611</td>
<td>0</td>
</tr>
<tr>
<td>occupants)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi Seater Van</td>
<td>1081</td>
<td>4</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>1150</td>
<td>34</td>
</tr>
<tr>
<td>Moped</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Skateboard</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Bicycle</td>
<td>674</td>
<td>10</td>
</tr>
<tr>
<td>Other/Not known</td>
<td>2267</td>
<td>3*</td>
</tr>
<tr>
<td>TOTAL</td>
<td>75835</td>
<td>198</td>
</tr>
</tbody>
</table>

* “Other/not known” fatalities include 1 wheelchair user and 2 heavy equipment operators.
6. GLOSSARY

AIR BAGS: A large nylon bag which is inflated and deflated rapidly during certain types of collision.

ARRESTER BED: A bed of gravel or loose aggregate placed on long steep hills to safely stop runaway heavy vehicles.

ARTICULATED TRUCKS: Vehicles constructed primarily for load carrying, consisting of a prime mover having no significant load carrying area but with a turn table device which can be linked to a trailer. With or without a trailer the Gross Combination Mass (GCM) will exceed 3.5 tonnes.

BAC: Blood Alcohol Content expressed as a percentage, required by legislation to be grams of alcohol per 100 ml of blood. Commonly expressed in milligrams of alcohol per litre of blood (mg/L). For example, 0.05% BAC is equivalent to 5 mg/L.

BICYCLE: Two or three wheeled vehicle designed to be propelled solely by human power, or a two or three wheeled vehicle that is a power assisted pedal cycle.

BICYCLIST: Person riding a bicycle. Includes passengers.

BOOZE BUS: A mobile random breath testing station.

CASUALTY: Person killed or injured as a result of a road crash.

CHILD RESTRAINT: Device for restraining a child travelling in a motor vehicle (i.e. baby capsule, baby seat, booster seat, etc.).

CNS-ACTING DRUGS: Include prescription drugs (e.g. anti-depressants, tranquillisers and sedatives) and illicit drugs (e.g. cannabis, psychostimulants and opioids).

CRASH: Any apparently unpremediated collision reported to the police which resulted from the movement of at least one road vehicle on a road open to and used by the public, and involving death or injury to any person or property damage. Any one crash can involve more than one road vehicle and result in more than one death or injury.

CRASH SEVERITY: Derived from the most serious injury in a crash, or if no injury, from the dollar value of property damage. The six levels are:

1. fatal crash
2. injury crash requiring hospitalisation
3. injury crash requiring medical treatment
4. injury crash requiring no medical treatment, i.e. minor injury or extent of injury unknown
5. major property damage - over $1,000
6. minor property damage - under $1,000.

DRIVER: Any person in control of a car, truck, or bus. Does not include persons in control of a motorcycle, moped or bicycle.

FATAL CRASH: A road crash where at least one person died within 30 days of a crash as a result of injuries sustained in the crash. The crash must occur on a road open to and used by the public, and involve a vehicle which was in motion. It cannot be an ‘Act of God’, an act of deliberate intent, or as a result of a prior event such as a heart attack.

FATALITY: Person who dies, within thirty days of a road crash, from injuries sustained in that road crash.
FORS: Federal Office of Road Safety, Commonwealth Department of Transport.

HELMET: Protective device worn on the head to prevent head injuries in the event of a crash. Required to be worn by bicyclists and motorcyclists. Required by legislation to meet Australian Standards or Snell Foundation Standards.

HOSPITALISATION INJURY: Person admitted to hospital as a result of a road crash and who does not die from injuries sustained in the crash within 30 days of the crash.

ILLEGAL DRUGS: Such as amphetamines, marijuana and hallucinogens.

INCIDENT COSTS: Costs resulting from the crash itself such as delay to other traffic, vehicle insurance administration, crash investigation/reporting, legal costs, alternate transport and other property damage costs.

INJURY SEVERITY: The level of injury sustained by a person involved in a crash. The five levels are:

1. killed from road crash injuries within 30 days of the road crash
2. injured, admitted to hospital
3. injured, requiring medical treatment
4. injured, no medical treatment required or extent of injury unknown
5. not injured.

KILLED: Died from injuries sustained in a road crash within 30 days of the road crash.

LEGAL DRUGS/PRESCRIBED MEDICATIONS: Referring to barbiturates and other sedatives, hypnotics and over-the-counter medications, including antihistamines.

MAJOR PROPERTY DAMAGE: Property damage exceeding $1,000. It is required by law that crashes resulting in property damage of more than $1,000 must be reported to the police.

MDL: Motor Driver’s Licence.

METROPOLITAN: Area equivalent to Perth Statistical Division defined by the Australian Bureau of Statistics. Perth Statistical division comprises the following local government areas:

- Armadale
- Bassendean
- Bayswater
- Belmont
- Canning
- Cambridge
- Claremont
- Cockburn
- Cottesloe
- East Fremantle
- Fremantle
- Gosnells
- Kalamunda
- Kwinana
- Melville
- Mosman Park
- Mundaring
- Nedlands
- Peppermint Grove
- Perth
- Rockingham
- Serpentine-Jarrahdale
- Shepparton
- South Perth
- Stirling
- Subiaco
- Swan
- Victoria Park
- Vincent
- Wanneroo

MINOR INJURIES: Injuries of a minor nature such as sprains and bruises, not requiring medical treatment.

MINOR PROPERTY DAMAGE: Property damage less than $1,000. No legislative requirement to report crashes of this nature, but can be reported to the police for insurance purposes.
MOTORCYCLE: Two or three wheeled motorised vehicle designed to transport people. Includes motorcycle with or without a sidecar; motor scooter; trail bike; mini bike; and moped.

MOTORCYCLISTS: Person riding a motorcycle. Includes pillion and sidecar passengers.

MULTI-VEHICLE CRASH: A collision between any two or more moving motor vehicles.

PASSENGER: Person other than the driver travelling in or on a car, truck, or bus. Does not include motorcyclists or bicyclists.

PEDESTRIAN: Person on foot or a person on skates, child’s tricycle, wheelchair, roller blades, or other unpowered vehicles (not including bicycles). Includes a person who has just alighted from a vehicle. As at January 1994 does not include a skateboard rider.

PERSON COSTS: The costs attached to each crash type related to the persons involved. Includes medical costs, loss of productivity and future earnings, and pain and suffering.

POTENTIAL YEARS OF LIFE LOST: Calculated from a combination of the expected age at death (70) minus actual age at death, and the probability of dying from that age on.

POLICE TRAFFIC REGIONS: Fremantle and Midland police traffic regions are not based on local government areas and include both metropolitan and rural statistics.

PROBATIONARY DRIVER: First year driver, restricted to a maximum speed limit of 90 km/h and 0.02% BAC. Required to display ‘P’ plates at all times on any vehicle being driven.

RANDOM BREATH TEST (RBT): A random breath test involves the random selection of drivers to provide a sample of breath to obtain a blood alcohol reading.

ROADWATCH: Road Crash Prevention Research Unit (University of Western Australia).

RIDER: Any person in control of a motorcycle, moped, bicycle, skateboard or animal.

RIGID TRUCKS: Vehicles constructed primarily for load carrying with a gross vehicle mass (GVM) exceeding 3.5 tonnes. Includes trucks with a tow bar, draw bar or other non-articulated coupling on the rear for use with a trailer or dolly.

ROAD TOLL: Count of fatalities resulting from road crashes.

ROAD USER: Driver, passenger, motorcyclist, bicyclist and pedestrian.

RURAL: Area of state outside Perth Statistical Division as defined by the Australian Bureau of Statistics (see metropolitan).

SEAT BELT: Device designed to hold a person within the body of a vehicle and limit movement during a crash, thereby reducing severity of injury. Includes inertia reel and fixed lap/sash seat belts, lap belts, and child restraints such as capsules. Device must meet Australian Vehicle Design Regulations.

SERIOUS CASUALTY: Person killed or hospitalised as a result of a road crash.

SERIOUS CRASH: Road crash which results in fatalities or hospitalisations.

SHOULDER: Portion of a carriageway beyond the traffic lanes and contiguous and flush with the surface of the pavement (Australian Standard 1348).

SINGLE-VEHICLE CRASH: Crash in which only one moving motor vehicle is involved. Includes collision with a fixed object, such as a tree, pole, bridge, animal or parked vehicle, and a non-collision such as a roll-over.

SPEEDING: Excessive speed for the prevailing conditions, or travelling above the posted speed limit.

U/K: Unknown.
VEHICLE: Device upon which any person or property may be transported or drawn upon a road. Includes bicycles, skateboards, and animal transport, e.g. horses.
7. REFERENCES


BUREAU OF METEOROLOGY, WESTERN AUSTRALIA (1997). Personal communication.


INJURY CONTROL PROGRAM (1997). Personal communication.


TRANSPORT INFORMATION MANAGEMENT SECTION (1997). Road Fatalities on South Australia. Department of Transport, South Australia.


## Appendix i: Western Australian Road Crash Trends, 1961-1996

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Note: Death/injury rate is number
1 per 10,000 motor vehicles registered.
2 per 100,000 estimated residential population.
3 per 100 million kilometres travelled estimate.
* Hospitalised casualties include number of persons killed and persons requiring hospitalisation.
N/A denotes information not recorded or not available.

Appendix i: Western Australian Road Crash Trends, 1961-1996 cont’d
**October 1997**

**Reported Road Crashes in WA: Statistics for 1996**

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Note: Death/injury rate is number

1 per 10,000 motor vehicles registered.

2 per 100,000 estimated residential population.

3 per 100 million kilometres travelled estimate.

* Casualties include number of persons killed, persons requiring hospitalisation and medical attention.

N/A denotes information not recorded or not available.
APPENDIX ii: Fatalities by Road User and Age for 1996 - Statewide

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Note: [1]Bicyclist injuries are significantly under reported (see Section 2.5)
**APPENDIX iii: Hospitalisation Statistics by Road User and Age for 1996 - Statewide**

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Note: 
- Bicyclist injuries are significantly under reported (see Section 2.5)
- * Does not include road user group “Other” and age “Unknown”

---

Road Safety Council of Western Australia

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### Appendix iv: Western Australian Demographics, 1961-1996

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**Road Safety Council of Western Australia**

October 1997
### Reported Road Crashes in WA: Statistics for 1996

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## Appendix viii: Pedestrian fatalities and hospitalisations by age group and time of day.

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Reported Road Crashes in WA: Statistics for 1996

October 1997
1969  On-the-Spot Traffic Infringement Notices (TIN) introduced.
1969  Seat Belts to be fitted to motor cars, front seats only.
1970  Legal Drinking Age was changed from 21 years to 18 years
1971  Seat Belts to be fitted to motor cars, all seats.
1971  Seat Belts - compulsory wearing of, where fitted.
1971  Head Supports. - all cars manufactured on or after 1 January 1972
1974  Road Traffic Act and its regulations was enacted.
1974  Helmets - all motorcyclists are required to wear an approved protective helmet. Pillion passengers of six years of age and older must also wear an approved protective helmet (this legislation currently under review).
1975  Demerit Points introduced. - loss of 12 points results in a three month suspension.
1975  Preliminary Breath Testing Device introduced. The Alcotest (crystals) was first used to detect alcohol.
1975  Evidentiary Breath Testing Machine introduced. The Breathalyser was first used to provide evidence of BAC.
1977  Child Restraints to be used for children between one and seven years of age.
1978  Maximum speed of 60 km/h introduced in built-up areas, except where zoned a different speed limit.
1978  Maximum speed of 110 km/h in other than zoned or built-up areas.
1979  Driver’s Responsibility for Seat Belt Wearing to Include Children aged one to seven years.
1979  Red Light Camera installations at traffic light controlled intersections.
1979  Protective Helmets - the offences of riding a motorcycle without a helmet and carrying a passenger without a helmet on a motorcycle each attract two demerit points.
1980  Police Road-Blocks commenced.
1981  **Road Traffic Board** established to administer the Road Traffic Act.
1982  ‘Digitector’ introduced - first high volume speed detection device.
1982  **Limit of 0.02% BAC for Probationary Drivers.** Penalty of cancellation of probationary licence and $100 fine.
1988  **Random Breath Testing** (RBT) introduced.
1989  **Failing to Wear a Seat Belt Infringement** - Penalty for increased from $50 to $100.
1989  **Seat Belt Exemption Repealed** - for passengers over the age of 70 years.
1989  **Prime Minister 10 Point Road Safety Package** was devised.
1989  **Australian Design Rules were Adopted for Vehicles** manufactured on or after 1 July 1998.
1990  **Speeding Increments And Penalties Increased** for Traffic Infringement Notices.
1990  **Speed Camera Radar** introduced.
1991  **Speed Limiting Device** legislation for heavy vehicles introduced.
1992  **Compulsory Bicycle Helmet** wearing legislation.
1992  **Stealing of Motor Vehicle** became a Criminal Offence.
1992  **Speeding Offences Committed by Drivers of Heavy Vehicles** - increased Traffic Infringement Notice penalties.
1993  **Limit of 0.05% BAC Legislation Introduced** - Penalty of $100 Traffic Infringement Notice and three demerit points (effective as at 16 June 1993).
1993  **Local Traffic Areas 40 km/h** legislation introduced.
1994  **Seat belt regulations repealed and new regulations enacted.** As at 1 January 1995 all children, regardless of age to be correctly restrained.
1994  **Maximum speed increased**
   •  probationary drivers from 80 km/h to 90 km/h
   •  some main arterial roads from 90 km/h to 100 km/h.
1995  **Towed Agricultural Implements Regulations** enacted on the use of agricultural implements towed on the roads.
1995  **Young Offenders Act** deals with all juvenile offenders and introduces the Juvenile Justice Teams.
1995  **Fines Enforcement** - suspension of Motor Driver’s Licence for non-payment of fines.
1996  **Road Safety Council** (RSC) was formed to replace the Traffic Board of Western Australia.
1996  **‘Keep Left’ Regulation** introduced - requires all vehicles to keep left unless overtaking, intending to turn right, or they have another good reason for being in the right lane.
ADDENDUM

APPENDIX x: Severity of Police Reported Crashes by Police Traffic Region - 1996

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* Includes 1 - region unknown

Regional and District Offices:

- Region: METROPOLITAN
  Districts: Cannington; Fremantle; Joondalup; Midland; Mirrabooka; Perth
- Region: CENTRAL
  Districts: Kalgoorlie; Meekatharra
- Region: NORTHERN
  Districts: Broome; Karratha
- Region: SOUTHERN
  Districts: Albany; Bunbury; Geraldton; Narrogin; Northam
NOTES