Australian Government

Australian Transport Safety Bureau

ROAD SAFETY STATISTICS REPORT

Serious Injury Due To Road Crashes

June 2004

SERIOUS INJURY DUE TO ROAD CRASHES

(a report produced and published by the Australian Transport Safety Bureau, Canberra, June 2004)

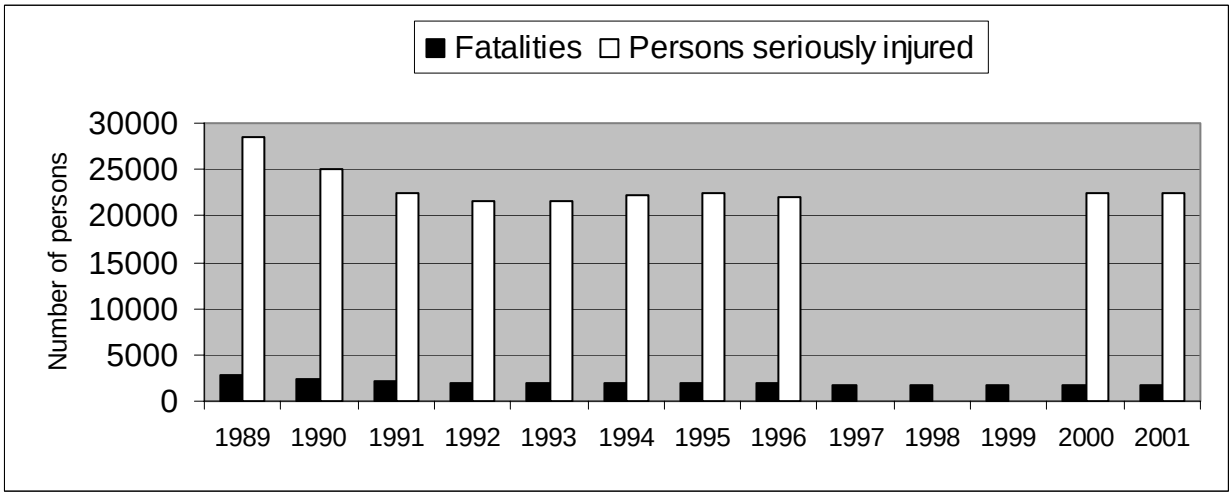
Introduction

The purpose of this publication is to monitor the numbers of persons seriously injured due to road crashes in Australia and the types of injuries sustained. The publication is based on data obtained from the States and Territories and the ATSB gratefully acknowledges the assistance of the Department of Health in each jurisdiction. Responsibility for the analysis rests solely with the ATSB.

A 'road crash' is defined as a crash involving a road vehicle on a public road. 'Road vehicles' include motor vehicles, bicycles and trams. 'Serious injury' is defined as an injury which results in the person being admitted to hospital, spending at least one night in a hospital bed and subsequently recovering (i.e. deaths are excluded). This definition of serious injury is consistent with that used by other OECD countries in providing data to the International Road Traffic and Accident Database (IRTAD - please see the notes at the end of this report).

Around 22,000 people per year, on average, are seriously injured in road crashes in Australia or, on average, about 11 times the number of people fatally injured in road crashes each year (**Figure 1**).

Figure 1
Fatalities and persons seriously injured due to road crashes, Australia, 1989 to 2001



Note: Figures to 1996 are based on police reports. Figures from 2000 are based on hospital records. Serious injury figures for 1997-99 are not available as police reports were not nationally collated from 1997 onwards and reporting of figures based on hospital records 1997-99 was not comparable with 2000 onwards due to coding changes.

This report is presented in two sections. Section One presents the numbers of persons seriously injured each year in terms of various classifications (mode of transport, road user group, age, gender and type of principal injury). Data are currently available for the period July 1999 to June 2002. Section Two presents injury rates for the calendar years 2000 and 2001.

SECTION ONE: PERSONS SERIOUSLY INJURED

Table 1
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: road user group by period

	Drivers	Passengers	Pedestrians	Motorcyclists	Bicyclists	Other	Total
Jul-Dec 1999	3242	3071	1471	1895	1257	209	11145
Jan-Jun 2000	3297	2952	1395	2067	1384	144	11239
Jul-Dec 2000	3454	2939	1472	2001	1215	155	11236
Jan-Jun 2001	3230	2825	1328	2161	1198	151	10893
Jul-Dec 2001	3672	2994	1326	2187	1191	132	11502
Jan-Jun 2002	3414	2883	1260	2299	1303	114	11273

Note: ‘Motorcyclists’ includes pillion passengers. ‘Other’ includes occupant of streetcar, occupant of train, animal-rider or occupant of animal-drawn vehicle, and unknown road user.

Table 2
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: age group by period

	0-16 years	17-20 years	21-25 years	26-39 years	40-59 years	60+ years	Total
Jul-Dec 1999	1818	1407	1396	2637	2172	1715	11145
Jan-Jun 2000	1757	1370	1346	2818	2234	1714	11239
Jul-Dec 2000	1684	1394	1418	2723	2306	1709	11236
Jan-Jun 2001	1542	1316	1420	2659	2315	1632	10893
Jul-Dec 2001	1560	1500	1449	2829	2387	1695	11502
Jan-Jun 2002	1531	1390	1371	2861	2385	1642	11273

Note: Persons of unknown age are not shown but are included in the total.

Table 3
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: mode of transport by period

	Car	Motorcycle	Pick-up truck or van	Heavy transport vehicle	Bus	Other motor vehicle	Other mode of transport	Total
Jul-Dec 1999	5897	1895	117	154	94	51	2937	11145
Jan-Jun 2000	5806	2067	124	181	85	53	2923	11239
Jul-Dec 2000	5948	2001	104	166	130	45	2842	11236
Jan-Jun 2001	5626	2161	91	176	121	41	2677	10893
Jul-Dec 2001	6224	2187	107	169	112	54	2649	11502
Jan-Jun 2002	5837	2299	95	182	118	65	2677	11273

Note: ‘Mode of transport’ means the vehicle occupied by the person seriously injured. ‘Other motor vehicle’ includes three-wheeled motor vehicle, special industrial vehicle, special construction vehicle, special all-terrain or off-road vehicle, and special agricultural vehicle. ‘Other mode of transport’ includes pedestrian, bicycle, streetcar, animal or animal-drawn vehicle, train and unknown mode.

Table 4
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: road user group by gender and period

	Drivers	Passengers	Pedestrians	Motorcyclists	Bicyclists	Other	Total
Males							
Jul-Dec 1999	1940	1498	875	1743	1000	109	7165
Jan-Jun 2000	1983	1403	857	1906	1121	92	7362
Jul-Dec 2000	2057	1412	903	1838	980	91	7281
Jan-Jun 2001	1955	1372	790	1972	965	95	7149
Jul-Dec 2001	2261	1441	811	2015	971	72	7571
Jan-Jun 2002	2076	1394	770	2116	1058	61	7475
Females							
Jul-Dec 1999	1302	1573	596	152	257	100	3980
Jan-Jun 2000	1314	1549	538	161	263	52	3877
Jul-Dec 2000	1397	1527	569	163	235	64	3955
Jan-Jun 2001	1275	1453	538	189	233	56	3744
Jul-Dec 2001	1411	1553	515	172	220	60	3931
Jan-Jun 2002	1338	1489	490	183	245	53	3798
Persons							
Jul-Dec 1999	3242	3071	1471	1895	1257	209	11145
Jan-Jun 2000	3297	2952	1395	2067	1384	144	11239
Jul-Dec 2000	3454	2939	1472	2001	1215	155	11236
Jan-Jun 2001	3230	2825	1328	2161	1198	151	10893
Jul-Dec 2001	3672	2994	1326	2187	1191	132	11502
Jan-Jun 2002	3414	2883	1260	2299	1303	114	11273

Note: ‘Motorcyclists’ includes pillion passengers. ‘Other’ includes occupant of streetcar, occupant of train, animal-rider or occupant of animal-drawn vehicle, and unknown road user.

Table 5
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: age group by road user group and period

	0-16 years	17-20 years	21-25 years	26-39 years	40-59 years	60+ years	Total
Drivers							
Jul-Dec 1999	35	454	469	887	850	547	3242
Jan-Jun 2000	29	455	454	936	839	584	3297
Jul-Dec 2000	16	452	502	929	954	601	3454
Jan-Jun 2001	27	449	394	889	903	565	3230
Jul-Dec 2001	27	514	519	1023	937	622	3672
Jan-Jun 2002	29	464	492	931	864	609	3414
Passengers							
Jul-Dec 1999	561	467	352	546	518	627	3071
Jan-Jun 2000	479	446	326	567	534	600	2952
Jul-Dec 2000	504	490	352	523	493	575	2939
Jan-Jun 2001	502	433	387	474	477	550	2825
Jul-Dec 2001	498	493	329	537	518	599	2994
Jan-Jun 2002	474	463	307	558	504	553	2883
Pedestrians							
Jul-Dec 1999	365	120	119	263	252	352	1471
Jan-Jun 2000	329	114	109	249	251	343	1395
Jul-Dec 2000	373	117	108	260	232	382	1472
Jan-Jun 2001	313	112	102	233	247	321	1328
Jul-Dec 2001	318	110	108	219	245	323	1326
Jan-Jun 2002	277	86	110	216	255	306	1260
Motorcyclists							
Jul-Dec 1999	182	270	359	676	356	52	1895
Jan-Jun 2000	191	240	368	791	411	66	2067
Jul-Dec 2000	186	235	361	766	396	57	2001
Jan-Jun 2001	198	225	423	808	444	60	2161
Jul-Dec 2001	179	284	398	821	442	43	2187
Jan-Jun 2002	191	275	372	869	498	72	2299
Bicyclists							
Jul-Dec 1999	642	84	80	220	149	82	1257
Jan-Jun 2000	710	96	82	246	174	76	1384
Jul-Dec 2000	580	89	80	209	199	58	1215
Jan-Jun 2001	490	85	97	221	215	89	1198
Jul-Dec 2001	521	84	86	208	217	68	1191
Jan-Jun 2002	551	92	85	267	235	64	1303
Other							
Jul-Dec 1999	33	12	17	45	47	55	209
Jan-Jun 2000	19	19	7	29	25	45	144
Jul-Dec 2000	25	11	15	36	32	36	155
Jan-Jun 2001	12	12	17	34	29	47	151
Jul-Dec 2001	17	15	9	21	28	40	132
Jan-Jun 2002	9	10	5	20	29	38	114
Total							
Jul-Dec 1999	1818	1407	1396	2637	2172	1715	11145
Jan-Jun 2000	1757	1370	1346	2818	2234	1714	11239
Jul-Dec 2000	1684	1394	1418	2723	2306	1709	11236
Jan-Jun 2001	1542	1316	1420	2659	2315	1632	10893
Jul-Dec 2001	1560	1500	1449	2829	2387	1695	11502
Jan-Jun 2002	1531	1390	1371	2861	2385	1642	11273

Note: Persons of unknown age are not shown but are included in the total. ‘Motorcyclists’ includes pillion passengers. ‘Other’ includes occupant of streetcar, occupant of train, animal-rider or occupant of animal-drawn vehicle, and unknown road user.

Table 6
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: mode of transport by gender and period

	Car	Motorcycle	Pick-up truck or van	Heavy transport vehicle	Bus	Other motor vehicle	Other mode of transport	Total
Males								
Jul-Dec 1999	3132	1743	94	144	31	37	1984	7165
Jan-Jun 2000	3046	1906	103	169	25	43	2070	7362
Jul-Dec 2000	3146	1838	90	158	40	35	1974	7281
Jan-Jun 2001	3023	1972	77	163	40	24	1850	7149
Jul-Dec 2001	3368	2015	89	159	42	44	1854	7571
Jan-Jun 2002	3125	2116	76	176	38	55	1889	7475
Females								
Jul-Dec 1999	2765	152	23	10	63	14	953	3980
Jan-Jun 2000	2760	161	21	12	60	10	853	3877
Jul-Dec 2000	2802	163	14	8	90	10	868	3955
Jan-Jun 2001	2603	189	14	13	81	17	827	3744
Jul-Dec 2001	2856	172	18	10	70	10	795	3931
Jan-Jun 2002	2712	183	19	6	80	10	788	3798
Persons								
Jul-Dec 1999	5897	1895	117	154	94	51	2937	11145
Jan-Jun 2000	5806	2067	124	181	85	53	2923	11239
Jul-Dec 2000	5948	2001	104	166	130	45	2842	11236
Jan-Jun 2001	5626	2161	91	176	121	41	2677	10893
Jul-Dec 2001	6224	2187	107	169	112	54	2649	11502
Jan-Jun 2002	5837	2299	95	182	118	65	2677	11273

Note: ‘Mode of transport’ means the vehicle occupied by the person seriously injured. ‘Other motor vehicle’ includes three-wheeled motor vehicle, special industrial vehicle, special construction vehicle, special all-terrain or off-road vehicle, and special agricultural vehicle. ‘Other mode of transport’ includes pedestrian, bicycle, streetcar, animal or animal-drawn vehicle, train and unknown mode.

Table 7
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: type of principal injury by period

	Head	Neck	Thorax	Abdomen, lower back, lumbar spine & pelvis	Upper limb	Hip & thigh	Lower limb	Other	Total
Jul-Dec 1999	2718	631	1491	1225	2127	641	2144	168	11145
Jan-Jun 2000	2639	657	1598	1260	2230	609	2070	176	11239
Jul-Dec 2000	2594	661	1520	1263	2257	673	2117	151	11236
Jan-Jun 2001	2378	753	1511	1284	2088	670	2033	176	10893
Jul-Dec 2001	2651	831	1561	1328	2221	626	2117	167	11502
Jan-Jun 2002	2572	808	1505	1266	2272	622	2035	193	11273

Note: ‘Type of principal injury’ is the principal diagnosis recorded by the hospital as chiefly responsible for occasioning the patient’s treatment in hospital. The principal diagnosis has been shown in research studies in Australia and overseas to be a good predictor of the probability of death for hospitalised patients. Information on the way in which the injury was sustained or how the person was hurt is not available. Examination of the details in the medical records would be necessary to obtain such information.

Table 8
Persons seriously injured in road crashes, Australia, July 1999 to June 2002: type of principal injury by road user group and period

	Head	Neck	Thorax	Abdomen, lower back, lumbar spine & pelvis	Upper limb	Hip & thigh	Lower limb	Other	Total
Drivers									
Jul-Dec 1999	897	280	667	371	400	130	446	51	3242
Jan-Jun 2000	882	314	724	381	402	130	421	43	3297
Jul-Dec 2000	892	332	768	407	457	154	396	48	3454
Jan-Jun 2001	818	378	701	388	355	136	401	53	3230
Jul-Dec 2001	976	433	758	448	424	138	446	49	3672
Jan-Jun 2002	914	419	705	403	400	120	391	62	3414
Passengers									
Jul-Dec 1999	810	264	553	435	448	160	344	57	3071
Jan-Jun 2000	726	248	577	439	459	126	310	67	2952
Jul-Dec 2000	722	228	481	486	467	161	345	49	2939
Jan-Jun 2001	655	266	487	464	433	165	308	47	2825
Jul-Dec 2001	699	284	499	478	452	173	350	59	2994
Jan-Jun 2002	705	283	475	439	473	157	304	47	2883
Pedestrians									
Jul-Dec 1999	442	20	57	127	232	115	460	18	1471
Jan-Jun 2000	406	25	69	130	202	120	428	15	1395
Jul-Dec 2000	415	33	62	110	236	124	479	13	1472
Jan-Jun 2001	384	24	60	122	177	113	430	18	1328
Jul-Dec 2001	409	33	62	101	184	112	416	9	1326
Jan-Jun 2002	361	26	62	105	193	104	393	16	1260
Motorcyclists									
Jul-Dec 1999	205	39	142	168	533	147	638	23	1895
Jan-Jun 2000	236	44	165	187	608	136	659	32	2067
Jul-Dec 2000	204	40	152	176	600	144	653	32	2001
Jan-Jun 2001	189	47	191	211	646	166	667	44	2161
Jul-Dec 2001	220	59	180	200	681	123	692	32	2187
Jan-Jun 2002	223	47	189	225	676	158	730	51	2299
Bicyclists									
Jul-Dec 1999	319	20	53	102	473	75	203	12	1257
Jan-Jun 2000	354	18	47	109	532	89	222	13	1384
Jul-Dec 2000	323	24	43	74	456	82	206	7	1215
Jan-Jun 2001	291	32	62	92	444	74	194	9	1198
Jul-Dec 2001	318	17	51	85	447	71	191	11	1191
Jan-Jun 2002	346	29	63	85	500	70	196	14	1303
Other									
Jul-Dec 1999	45	8	19	22	41	14	53	7	209
Jan-Jun 2000	35	8	16	14	27	8	30	6	144
Jul-Dec 2000	38	4	14	10	41	8	38	2	155
Jan-Jun 2001	41	6	10	7	33	16	33	5	151
Jul-Dec 2001	29	5	11	16	33	9	22	7	132
Jan-Jun 2002	23	4	11	9	30	13	21	3	114
Total									
Jul-Dec 1999	2718	631	1491	1225	2127	641	2144	168	11145
Jan-Jun 2000	2639	657	1598	1260	2230	609	2070	176	11239
Jul-Dec 2000	2594	661	1520	1263	2257	673	2117	151	11236
Jan-Jun 2001	2378	753	1511	1284	2088	670	2033	176	10893
Jul-Dec 2001	2651	831	1561	1328	2221	626	2117	167	11502
Jan-Jun 2002	2572	808	1505	1266	2272	622	2035	193	11273

Note: ‘Motorcyclists’ includes pillion passengers. ‘Other’ road user includes occupant of streetcar, occupant of train, animal-rider or occupant of animal-drawn vehicle, and unknown road user.

SECTION TWO: INJURY RATES

Table 9
Casualties due to road crashes, Australia, 2000 and 2001: summary data by calendar year

	Number of fatalities	Number of registered motor vehicles	Number of vehicle kilometres	Population	Fatalities per 10,000 vehicles	Fatalities per 100 million vehicle kilometres	Fatalities per 100,000 population
2000	1,817		184,593,000,000	19,153,380		1.0	9.5
2001	1,737	12,476,767	190,152,000,000	19,413,240	1.4	0.9	8.9
	Number of persons seriously injured	Number of registered motor vehicles	Number of vehicle kilometres	Population	Seriously injured per 10,000 vehicles	Seriously injured per 100 million vehicle kilometres	Seriously injured per 100,000 population
2000	22,475		184,593,000,000	19,153,380		12.2	117.3
2001	22,395	12,476,767	190,152,000,000	19,413,240	17.9	11.8	115.4

Note: Gaps indicate data not available.

Table 10
Casualties due to road crashes, Australia, 2000 and 2001: data for selected vehicle occupants by calendar year

Car occupants	Number of fatalities	Number seriously injured	Fatalities per 10,000 passenger vehicles	Seriously injured per 10,000 passenger vehicles	Fatalities per 100 million passenger vehicle kilometres	Seriously injured per 100 million passenger vehicle kilometres
2000	1136	11,754			0.8	8.3
2001	1037	11,850	1.1	12.0	0.7	8.2
Motorcyclists	Number of fatalities	Number seriously injured	Fatalities per 10,000 motorcycles	Seriously injured per 10,000 motorcycles	Fatalities per 100 million motorcycle kilometres	Seriously injured per 100 million motorcycle kilometres
2000	191	4,068			16.8	358.4
2001	216	4,348	6.2	123.9	14.9	300.3
Occupants of heavy transport vehicles	Number of fatalities	Number seriously injured	Fatalities per 10,000 heavy transport vehicles	Seriously injured per 10,000 heavy transport vehicles	Fatalities per 100 million heavy transport vehicle kilometres	Seriously injured per 100 million heavy transport vehicle kilometres
2000	42	347			0.3	2.9
2001	36	345	0.9	8.6	0.3	2.9
Bus occupants	Number of fatalities	Number seriously injured	Fatalities per 10,000 buses	Seriously injured per 10,000 buses	Fatalities per 100 million bus kilometres	Seriously injured per 100 million bus kilometres
2000	4	215			0.2	12.1
2001	8	233	1.2	34.5	0.4	12.7

Note: Gaps indicate data not available. Please see the notes at the end of this report for a description of the data sources used for this table.

Unfortunately, data on passenger kilometres travelled by motor vehicles are not routinely available in Australia. The measurement of 'passenger kilometres' takes into account the number of vehicle occupants as well as the distance travelled by each vehicle type. However, this information was obtained by the ATSB for 1994 and 1997 as below:

	Fatalities per 100 million passenger kilometres	Seriously injured per 100 million passenger kilometres
Car occupants		
1994	0.6	6.9
1997	0.5	6.4
Motorcyclists		
1994	11.9	170.1
1997	10.4	148.3
Bus occupants		
1994	0.1	0.8
1997	0.1	0.5

Source: ATSB, 2001, *Australian Bus Safety* (available at www.atsb.gov.au). Figures on persons seriously injured are based on police reports.

NOTES

The ATSB gratefully acknowledges the assistance of the Department of Health in each jurisdiction and Dr Peter O'Connor, who undertook the analysis of the data provided by the jurisdictions. The scope of this publication is restricted to information at the national level. Requests for further information on this publication should be emailed to stats@atsb.gov.au.

A road crash can lead to a person being admitted to the same hospital on multiple occasions and even admitted to a number of different hospitals. A method of estimation which calculates the number of people injured rather than the number of admissions has been devised. The method utilises patient identifiers such as hospital unit record number, Medicare number or unique person identifier, date of birth, sex, area of residence and other variables, which in combination are unique, or virtually unique, within the population. This method constitutes a significant advance on previous attempts which have not used unique patient identifiers.

The definition of serious injury used in this report is consistent with the IRTAD definition. The International Road Traffic and Accident Database (IRTAD), which holds data from member countries of the Organisation for Economic Cooperation and Development (OECD), defines seriously injured (or 'hospitalised') road users as accident victims admitted to hospital as in-patients and who remain there for at least 24 hours, excluding those who die.

The table below defines the vehicle occupant categories and sources of data used in Table 10. 'Car' as used in ICD-10-AM is very close to 'passenger vehicle' as used in the ABS publications *Motor Vehicle* Census and *Survey of Motor Vehicle* Use. 'Motorcycle' and 'bus' are also defined similarly. 'Heavy transport vehicle' in ICD-10-AM is equivalent to 'rigid truck' and 'articulated truck' combined in the ABS publications. While there is not perfect comparability, the rates calculated using these different data sources are considered to represent nonetheless a reasonable estimate.

ICD-10-AM[(a)]	Motor Vehicle Census[(b)]	Survey of Motor Vehicle Use[(c)]
Car – a four-wheeled motor vehicle designed primarily for carrying up to 10 persons. Includes minibus.	*Passenger vehicle* – a motor vehicle constructed primarily for the carriage of persons and containing up to nine seats (including the driver's seat). Includes car, station wagon, four-wheel drive passenger vehicle and forward-control passenger vehicle. Excludes campervan and mobile home.	*Passenger vehicle* – a motor vehicle constructed primarily for the carriage of persons and containing up to nine seats (including the driver's seat). Includes car, station wagon, four-wheel drive passenger vehicle, passenger van or minibus with fewer than 10 seats and campervan.
Motorcycle – a two-wheeled motor vehicle with one or two riding saddles and sometimes with a third wheel for the support of a sidecar. The sidecar is considered part of the motorcycle. Includes moped, motor scooter and motorised bicycle. Excludes motor-driven tricycle.	*Motorcycle* – a two or three-wheeled motor vehicle constructed primarily for the carriage of one or two persons. Includes moped, scooter, motor tricycle and motorcycle with sidecar.	*Motorcycle* – category used in publication but not defined in glossary. Presumably same definition as used in *Motor Vehicle Census*.
Heavy transport vehicle – a motor vehicle designed primarily for carrying property, meeting local criteria for classification as a heavy goods vehicle in terms of curbside weight (usually above 3500 kg), and requiring a special driver's licence.	Equivalent is combination of rigid and articulated trucks. *Rigid truck* – a motor vehicle exceeding 3.5 tonnes gross vehicle mass (GVM) and constructed with a load carrying area. Includes normal rigid truck with a tow bar, draw bar or other non-articulated coupling on the rear of the vehicle. Includes rigid truck with GVM 4.5 tonnes or less and rigid truck with GVM greater than 4.5 tonnes. *Articulated truck* – a motor vehicle constructed primarily for load carrying, consisting of a prime mover having no significant load carrying area but with a turntable device which can be linked to a trailer.	Equivalent is combination of rigid and articulated trucks. *Rigid truck* – a motor vehicle exceeding 3.5 tonnes gross vehicle mass (GVM) and constructed with a load carrying area. Includes normal rigid truck with a tow bar, draw bar or other non-articulated coupling on the rear of the vehicle. *Articulated truck* – a motor vehicle constructed primarily for load carrying, consisting of a prime mover having no significant load carrying area but with a turntable device which can be linked to a semi-trailer.
Bus – a motor vehicle designed or adapted primarily for carrying more than 10 persons, and requiring a special driver's licence.	*Bus* – a motor vehicle constructed for the carriage of passengers. Included are all motor vehicles with 10 or more seats, including the driver's seat.	*Bus* – a motor vehicle constructed for the carriage of passengers. Included are all motor vehicles with 10 or more seats, including the driver's seat.

(a) National Centre for Classification in Health, *International Statistical Classification of Diseases*, 10th revision, Australian modification, 2nd edition, (Sydney, 2000).
(b) Australian Bureau of Statistics, *Motor Vehicle Census: 31 March 2001* (9309.0).
(c) Australian Bureau of Statistics, *Survey of Motor Vehicle Use: 12 months ended 31 October 2000* (9208.0).

This report is based on hospital data coded in accordance with ICD-10-AM, which has been used by all Australian hospitals since July 1999. Application of the internationally recognised Abbreviated Injury Scale (AIS) and Injury Impairment Scale (IIS) to ICD-10 is work still underway internationally. Until this work is completed, information on levels of injury severity and impairment due to injury will not be available.