

# Motorcyclist Fatality and Motorcycle Sales Patterns in Australia: An Update

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## ABSTRACT

In their 2001 conference paper, Christie and Newland showed that the resurgence in on-road motorcycle numbers in Australia may have contributed to a corresponding increase in fatality for riders. Results presented in 2001 showed reductions in exposure and fatality for riders aged less than 25 years across the 1990s, but steady to rising patterns of exposure and fatality for older riders. Sales patterns also suggested that older riders were purchasing large, powerful motorcycles. This paper updates Christie and Newland's 2001 examination of relationships between Australian motorcycle rider fatality data and motorcycle sales patterns using the latest national and jurisdictional data available. Where possible, it looks for any changes in crash risk or involvement patterns together with changes in motorcycle sales by variables such as rider age, jurisdiction and type of motorcycle.

## INTRODUCTION

Motorcycle riders are more likely to be killed or injured on Australian roads than passenger vehicle occupants. Recent Australian Transport Safety Bureau research (ATSB, 2002) identified motorcycle travel as the most dangerous per distance travelled for any motorised road vehicle on Australian roads - estimating this risk at about 29 times the fatality risk for car occupants. The risk for novice motorcycle riders of any age is likely to exceed even this already highly elevated level in the first one to two years of solo riding (Christie, 2004). The high injury and fatality rate faced by motorcycle riders is due largely to the lack of protection and increased vulnerability to injury in the event of a crash (Haworth & Mulvihill, 2005).

Christie and Newland (2001) showed that the resurgence in on-road motorcycle numbers in Australia may have contributed to a corresponding increase in fatality for riders. Results presented in 2001 showed reductions in exposure and fatality for riders aged less than 25 years across the 1990s, but steady to rising patterns of exposure and fatality for older riders. Sales patterns also suggested that older riders were purchasing large, powerful motorcycles. This paper updates the examination of relationships between Australian motorcycle rider fatality data and motorcycle sales patterns using the latest national and jurisdictional data available. While the period 2001-2005 was of greatest interest, patterns for 1991-2005 were also examined where possible to provide a broader perspective. Changes in crash risk or involvement patterns together with changes in motorcycle sales by variables such as rider age, jurisdiction and type of motorcycle were examined where sufficient data were available to support this.

## METHOD

The authors obtained data from several national sources for the period 1991-2005 inclusive. Sources were as follows:

- Australian Transport Safety Bureau (ATSB) – motorcycle fatality data;
- Australian Bureau of Statistics (ABS) – registration and vehicle use data; and
- Federal Chamber of Automotive Industries (FCAI) motorcycle sales information.

The data available were not all that the authors would have wished for. For example, ABS survey of motor vehicle use information was not available for every year of interest with motorcycle usage data being the least reliable category collected (ABS, 2000).

Fatality data were relied as this information was available for the period 1991-2005 inclusive. As the number of motorcycle fatalities per annum is quite small in some jurisdictions (eg Tasmania) most patterns were explored at a national level. For similar reasons, separate consideration of pillion passengers was not pursued given the relatively small number killed or injured each year and the combination of riders and pillions in ATSB fatality data. Comparisons were sometimes made with passenger vehicle drivers to put fatality and usage/exposure patterns for motorcyclists into a broader context. Only road related motorcycle fatalities, sales/registrations and usage were examined.

Using the data sources summarised above, the authors examined the following in respect of the period 2001-2005 (or 1991-2005 where data permitted):

- general fatality patterns for motorcyclists;
- the relationship between rider age and fatality;
- exposure- to-risk patterns for motorcycle riders; and
- sales patterns for motorcycles (ie what type of motorcycles were being purchased and who was buying them).

## RESULTS

### *Motorcycle Deaths in Australia, 1991-2005*

Motorcyclist deaths in Australia decreased slightly between 1991 and 2005 (ie from 248 to 233) – a reduction of about 6% (ATSB, 2006). However, this reduction was less than half of the 13.5% decrease recorded for drivers over the same period (ie from 910 to 787) and only about a quarter of the near 23% reduction in all national road deaths between 1991 and 2005 (ie from 2113 to 1636). Deaths of motorcyclists as a percentage of overall road deaths in Australia also increased from about 12% to about 14% during this period while driver deaths increased as a proportion of all road deaths from about 43% to about 48% in the corresponding period. Fatality numbers for drivers and motorcycle riders for the period 1991-2005 are shown in Figure 1. In respect of the three largest states, motorcycle deaths trended downwards in Victoria but upwards in NSW and Queensland (more steeply in NSW) during this period. This contrasted with a downward trend in driver deaths for Australia, NSW, Victoria and Queensland.

As shown in Figure 2, the number of motorcycle deaths decreased more markedly for those aged under 26 years than for those aged 26 years or more between 1991 and 2005 (ie from 844 to 531 in respect of the former (decrease of about 37%) and from 1265 to 1095 in respect of the latter (decrease of 13%). Between 1991 and 2005, the number of deaths for drivers and riders aged 17-25 years trended downwards, while the trend for 26-39 year olds was flat.

However, for 40-59 year olds, driver deaths trended downwards while rider deaths trended upwards. It is of note that the average age of drivers killed rose from 39 to 41 year in the period 1991-2005, while the average age of riders killed rose more markedly from 28 to 35 years. Equally of note, ABS statistics show that the Australian population is ageing with the median age increasing from 31 years in 1985 to 37 in 2005 (ABS, 2005).

Figure 1: Driver & Motorcyclist Fatalities, Australia, 1991-2005 (source ATSB)

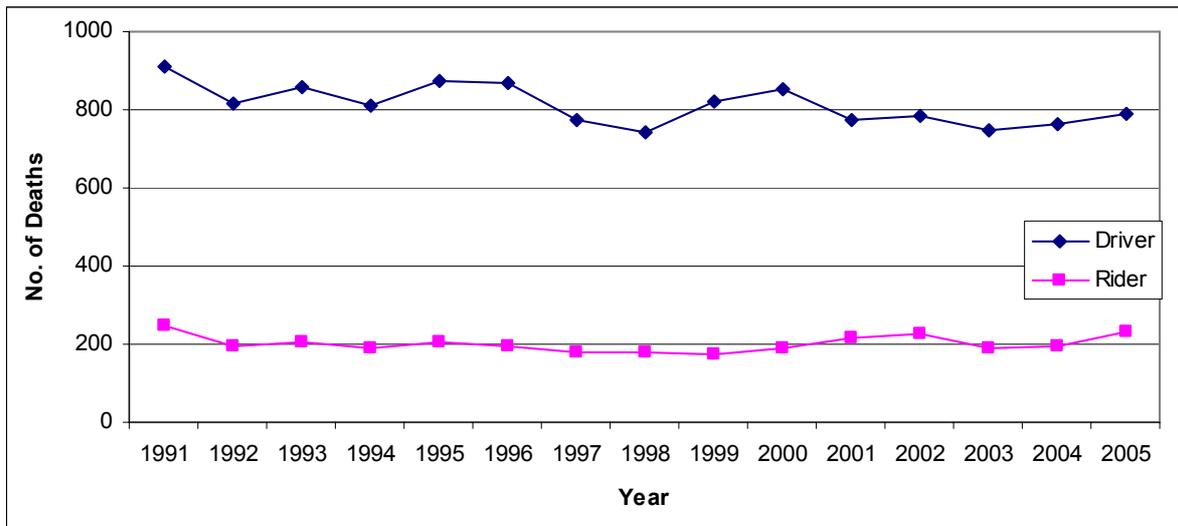
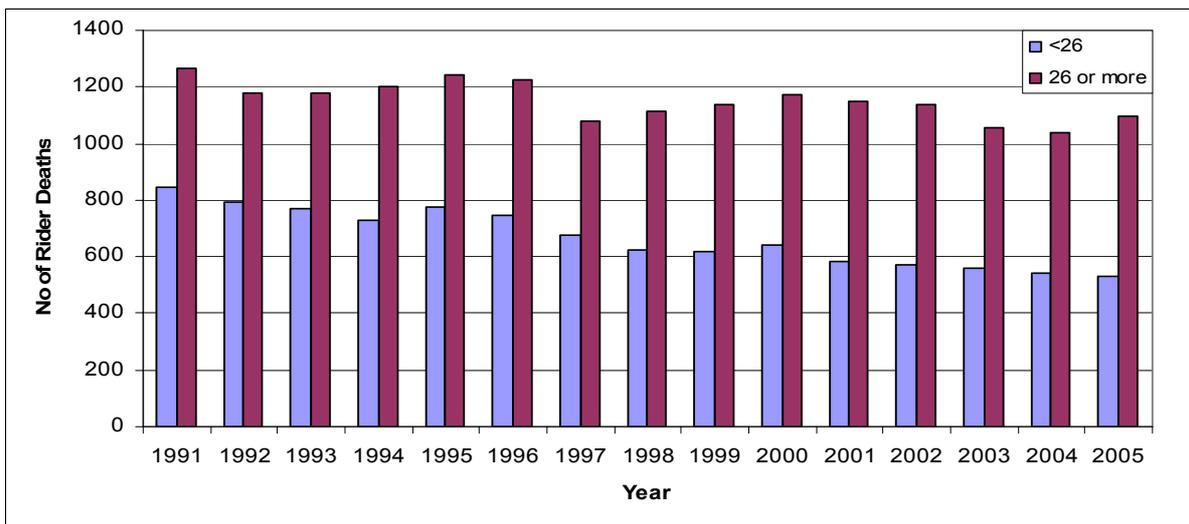


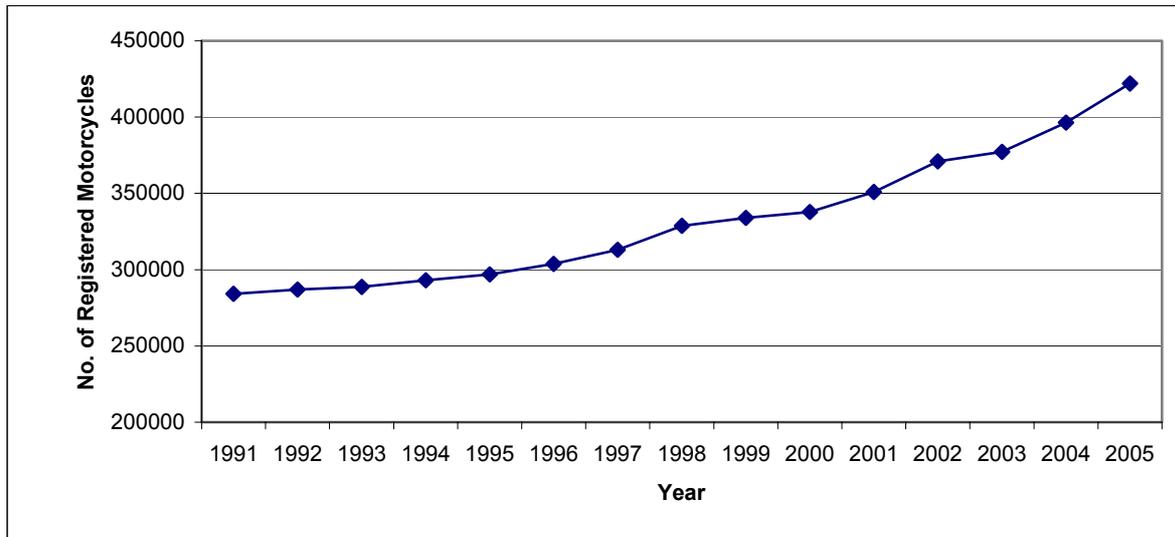
Figure 2: Motorcycle Deaths by Age Group, Australia, 1991-2005 (source ATSB)



*Motorcycle Registrations in Australia, 1991-2005*

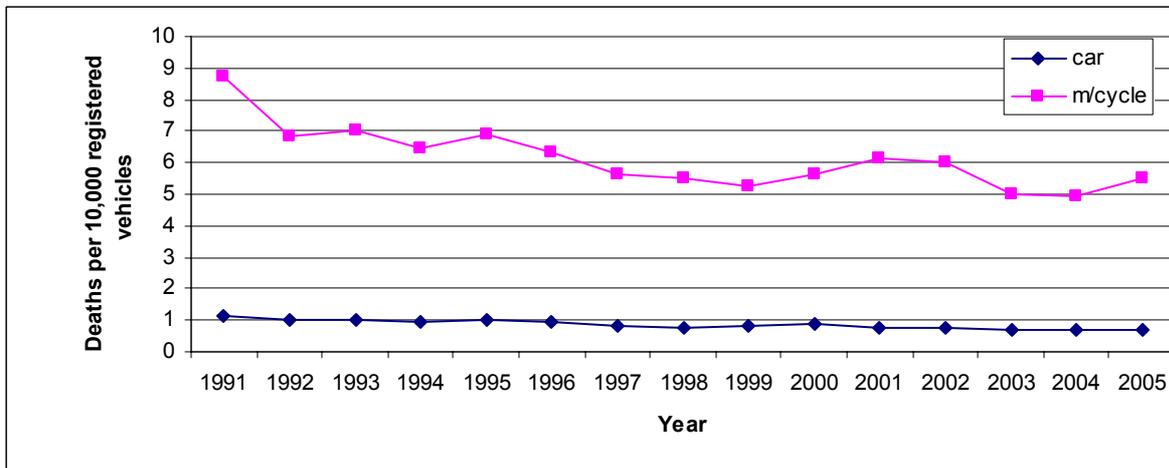
Since 1991, the number of motorcycles on the national register increased steadily by an average of about 2.9% per annum to reach about 420,000 by 2005 – about a 48% increase (ABS, 2005a). This pattern of increase is evident in Figure 3, which shows the total number of motorcycles on register in Australia between 1991 and 2005. During the same period passenger vehicles on the national register increased by up to 2.5% per annum with passenger vehicle numbers increasing by about 39% between 1991 and 2005. Since 2000, the annual increase for motorcycles has generally been higher than that for passenger vehicles with the number of registered motorcycles increasing by about 25% by 2005 compared to an increase of 12% for passenger cars during the same period.

Figure 3. Motorcycles on Register, Australia 1991-2005 (source: ABS)



It should be noted that registration data was used in preference to driver (rider) licensing data for comparisons as many motorcycle licence holders are inactive or dormant. For example, it can be calculated from vehicle registration and driver licensing data that the ratio of licence holders to registered motorcycles in Victoria is greater than two to one and almost four to one in NSW (personal communication, VicRoads and RTA (NSW), July 2006). While one could not assume that a person holding a motorcycle licence is an active rider, it is more probable that a currently registered motorcycle is being used on-road by its registered owner and at some risk of crash involvement.

Figure 4. Driver & Motorcyclist Deaths per 10,000 Registered Vehicles, Australia, 1991-2005 (source ATSB/ABS)



*Deaths per Registered Motorcycle in Australia, 1991-2005*

As shown in Figure 4, deaths per 10,000 registered vehicles trended downwards between 1991 and 2005 for both drivers and motorcycle riders (ABS, 1993, 1996, 1999, 2000, 2002, 2003, 2004; ATSB, 2006). Motorcycle rider deaths per 10,000 registered motorcycles fell from 8.7 in 1991 to 6.2 in 2001 and 5.5 in 2005.

Figure 5: Motorcycle Rider Deaths per Distance Travelled (100 million kilometres) per Annum: NSW, Victoria, Qld & Australia, 1998-2004 (source ATSB/ABS)

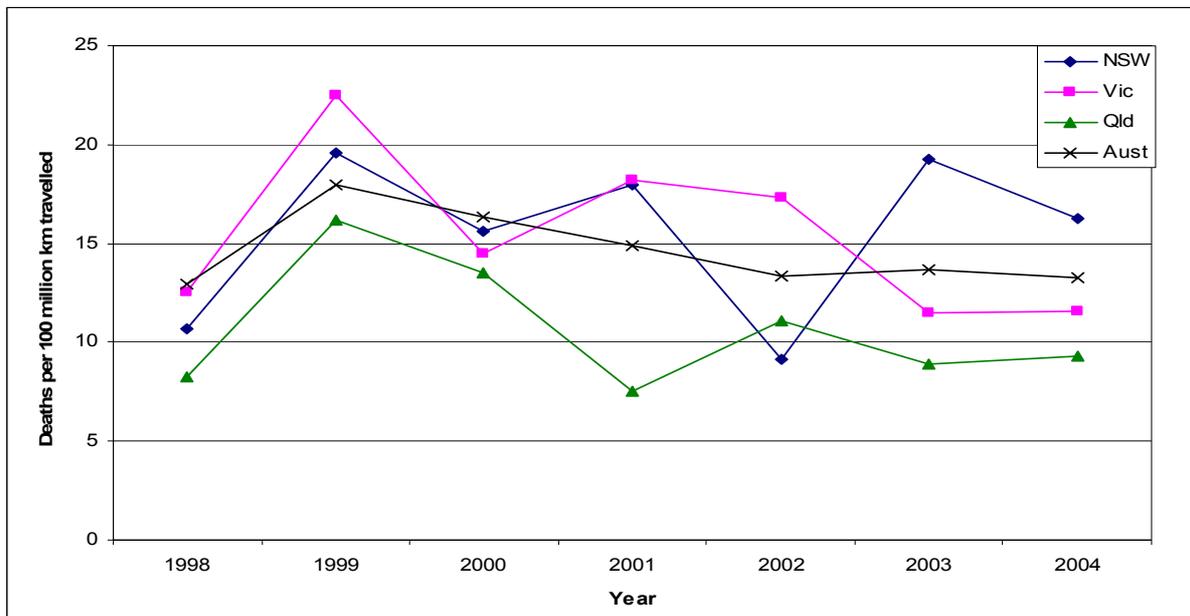
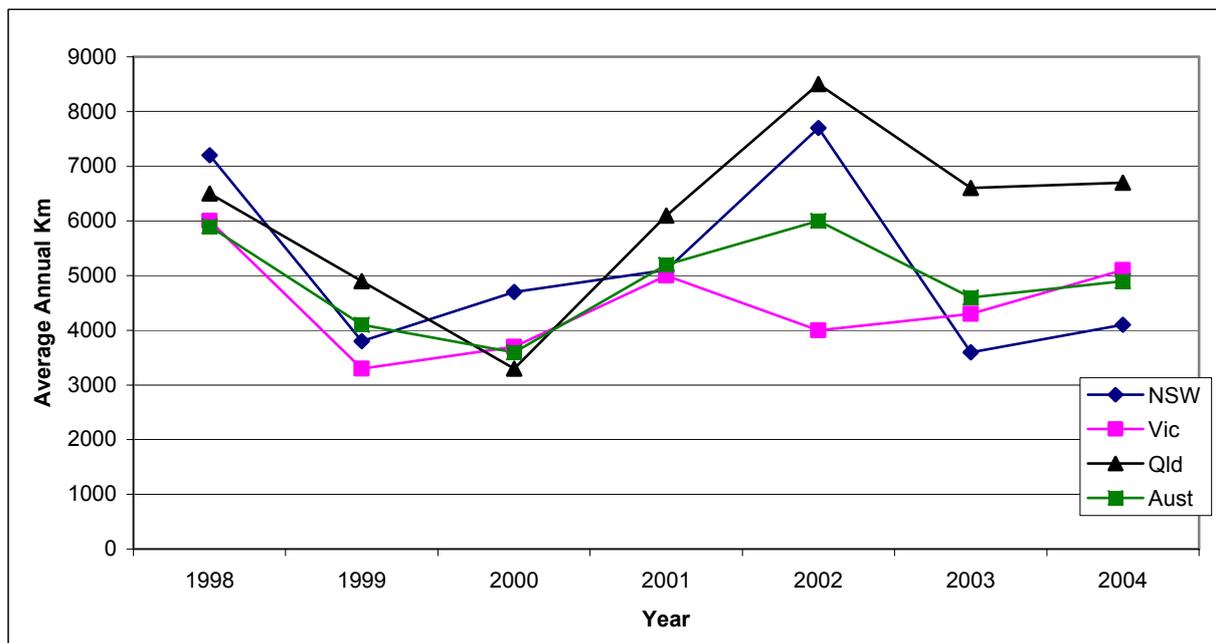


Figure 6: Average Annual Kilometres Travelled by Motorcycles in Australia, NSW, Victoria, Queensland, 1998-2004 (source ABS)



*Motorcycle Deaths per Distance Travelled in Australia, NSW, Victoria and Queensland, 1998-2004*

Using annual ABS survey of motor vehicle use which was available for consecutive years in respect of the period 1998-2004, motorcycle deaths per 100 million kilometres travelled were calculated for Australia and the three largest states (ie NSW, Victoria and Queensland) and are shown in Figure 5 (ABS, 1993, 1996, 1999, 2000, 2002, 2003, 2004; ATSB, 2006). Inspection of Figure 5 shows that motorcycle deaths per distance travelled trended downwards, nationally and in Victoria and Queensland but rose in NSW in the period 1998-2004.

At a national level, motorcycle deaths per 100 million kilometres travelled fell from about 15 in 2001 to about 13 in 2004. As shown in Figure 6, the average annual distance travelled by motorcycles in the period 1998-2004 trended upwards nationally and in Queensland, but was relatively flat to falling in NSW and flat to rising in Victoria.

#### *Motorcycle Sales Patterns*

Between 2001 and 2005, national sales information showed a continuation of new road motorcycle sales with 2005 breaking all previous sales records (FCAI, 2006). Sales for the 12 months to end of March 2006 were about 20% higher than for the corresponding period to March 2005. FCAI described the pattern for 2005 and early 2006 as:

*...a continuation of a trend that has emerged over the last two years, driven by middle aged riders returning to two wheels and a whole new segment of customers attracted by scooters.*  
(FCAI, 2006, p1)

This pattern has seen scooter sales increase from about 10% of national motorcycle sales in 2001 to about 26% of sales in 2005. Those buying and riding scooters appear to be different to those buying motorcycles in that they do not seem to progress to conventional motorcycle use. They are typically urban dwellers in large cities such as Melbourne, Sydney and Brisbane, use the scooter for short distance, local travel, which may include some commuting, and tend to be aged 25-35 years with a greater representation of women. The scooter is identified as a “fun” alternative to car or conventional motorcycle use – most scooters sold, about 70%, are in the 50cc (moped/noped) category allowing them to be operated on a car licence in some jurisdictions such as Queensland. As an aside, scooter sales in Queensland in 2005 were twice those of NSW and three times those of Victoria. A trend in the scooter market is for sales to occur via scooter shops rather than conventional motorcycle dealerships suggesting that the demographic may be different to those buying motorcycles. This is also reflected in scooters being increasingly marketed at motor shows as opposed to motorcycle sales/marketing events.

Sales of supersports machines (race replica style motorcycles, usually of 600cc engine capacity or above) have continued strongly, but accounted for only about 18% in 2005, down from about 40% in 2001. The purchasers of these machines are still typically in the 25-35 year old age band and almost exclusively male. Since 2001, sales of cruiser type motorcycles (retro-design motorcycles similar in style to the classic Harley-Davidsons) have increased to about 21% of national sales in 2005, making this type of machine the second largest seller after scooters. In 2005, touring, sports touring and adventure touring type motorcycles combined (ie powerful motorcycles designed for comfortable long-distance travel which have an upright seating position and often come with fairings and built-in panniers/luggage carriers) accounted for about 16% of national sales. While sales of new motorcycles up to 250cc accounted for about 19% of national sales in 2001 (sold mainly to learner and probationary/provisionally licensed riders who may not exceed a 250/260cc limit) this had fallen to about 8% by 2005.

As in 2001, 2005 sales saw the majority of new road motorcycle being of larger capacity machines, predominantly those with engine capacities of 600cc or more, with most being sold to existing full-licence holders aged 25 years or above. Unfortunately, it was not possible to determine what proportion of these were previously inactive/dormant licence holders returning to riding after an absence of months, years or even decades. However, since 2001, scooters have become a greater presence on Australian roads and in 2004 and 2005 Queensland overtook both NSW and Victoria in respect of new road motorcycle sales, including scooters.

## DISCUSSION

It would appear that the general patterns of motorcycle use and fatality in Australia are similar to those outlined by Christie and Newland (2001) some five years ago. Sale of large capacity motorcycles to predominantly older riders (ie over 25 years old, and often over 35 years old) returning to motorcycle riding after a period of dormancy has continued to increase at record rates.

Motorcycle deaths for riders aged under 25 years have continued to fall at a faster rate than that for older riders, with some age groups typical of older, returning riders (eg 40-59 year olds) experiencing an increase. However, a difference noted since 2001 has been a marked increase in the sales of new scooters which seem to be purchased by people outside the typical motorcycle rider demographic.

As in 2001, increasing motorcycle sales seem to be fuelled by middle-aged people with high levels of disposable income returning to motorcycling (FCAI, 2006). As noted by FCAI (2006) these motorcycles are not being purchased primarily for transport but rather for recreational use, particularly on weekends. This pattern is reflected in the preponderance of motorcycle crashes occurring on weekends, particularly in the afternoon (ATSB, 2006).

It is of interest that the ratio of registered motorcycles to motorcycle licences has fallen in both NSW and Victoria between 2001 and 2005 suggesting that more licence holders now own and, presumably use, motorcycle on Australian roads. This has been more marked in NSW where the ratio of registered motorcycles to motorcycle licence holders has fallen from about five to one to four to one. This may be contributing to the increase in NSW motorcycle deaths noted earlier in this paper.

While the number of motorcycle deaths increased nationally between 2001 and 2005 by about 8%, motorcycle deaths fell by about 6% over the longer period 1991-2005. As noted above, motorcycle deaths have not followed the same pattern as that for driver deaths over the last 15 years, recording only about half of the decrease experienced for drivers. Motorcycle riders killed in Australia also differ from drivers in that, while still typically younger than killed drivers, this group is ageing at a faster rate with the average age of riders killed increasing from 28 to 35 years between 1991 and 2005 compared to an increase of 39 to 41 for drivers. While both driver and rider deaths have been influenced by the general ageing of the Australian population acknowledged earlier in this paper, the age of killed motorcycle riders seems to have been particularly influenced by the increasing age of those buying and riding motorcycles in Australia.

It is of note that motorcycle deaths per registered motorcycle and per distance travelled have fallen in Australia between 1991 and 2005, including the period 2001 to 2005. As noted above, motorcycle rider deaths per 10,000 registered motorcycles fell from 8.7 in 1991 to 6.2 in 2001 and 5.5 in 2005 while motorcycle deaths per 100 million kilometres travelled fell from about 15 in 2001 to about 13 in 2004. This suggests that motorcycle riders and motorcycle riding in Australia are not becoming less safe per se. It seems more likely that the increase in the number of motorcycle deaths between 2001 and 2005 (ie from 216 to 233) is due to exposure factors such as greater numbers of motorcycles and riders using Australian roads.

Christie & Harrison (2002), in a motorcycle exposure study conducted in NSW, showed, via regression analysis (using NSW motorcycle fatality data from 1982 to 2000 as a criterion variable and the number of registered motorcycles and the average distance travelled as predictors), that it was possible to account for 84% of the variability in fatalities. They reported that both the average distance travelled and the number of vehicles are significant predictors when the contribution of the other is taken into account. This suggests that the changing pattern of Australian motorcycle fatalities is likely to be the result of changing patterns of ownership and use.

The results reported by Christie & Harrison (2002) are similar to those of a recent in-depth study of motorcycle crashes in the United Kingdom covering the period 1997-2002. Clarke et al (2004) showed that increases in number of motorcycles and the distance travelled by these vehicles was sufficient to account for increases in motorcycle crash numbers. In addition, Clarke et al (2004) reported usage and fatality patterns for UK motorcycles somewhat similar to those noted by Christie & Harrison (2002) in respect of Australia. These included an increase in the number of larger motorcycles on register (ie motorcycles of over 500cc engine capacity) which tend to travel greater distance per annum than smaller machines and therefore have greater exposure to crashes, injury and fatality. Clarke et al (2004) also reported that the number of killed motorcycle riders aged under 25 was decreasing relative to those aged over 25 years. It is of interest that an increase in scooter sales of about 16% was also noted in the UK for 2002 and 2003 (Clarke et al, 2004).

However, later reports show that scooter sales in the UK moderated to an annual increase of about 10% for the 12 months to March 2006, while motorcycle sales for the same period increased by about 13% (Motorcycle Industry Association, 2006).

#### *Brief Comparison with Motorcycle Registration and Fatality Experience in UK and USA*

By contrast with Australia, between 1994 and 2004, the UK experienced about a 5% increase in motorcycle casualties (killed and injured riders) which contrasted with a 6% decrease for driver casualties and 8% for all road casualties (Department of Transport, 2005). However, a decrease of 16% occurred in respect of motorcycle casualties between 2003 and 2004. Like Australia, the UK also experienced an increase in motorcycle sales with new registrations increasing by about 64% between 1997 and 2001 with the peak occurring in 2000. From 2001 onwards new registrations increased by between 7 and 10% per annum. In 2004, scooters represented 34% of new registrations and super sports 28% (see Motorcycle Industry Association website: [www.mcia.co.uk](http://www.mcia.co.uk)).

In comparison to the USA, Australia appears to be performing better in respect of motorcycle deaths. Between 1997 and 2004, US motorcycle deaths increased by 89% while the fatality rate per 10,000 vehicle rose from 6.2 to 6.9 and rate per distance travelled rose from about 14 to 24 per 100 million km between 1994 and 2003 (National Highway Transportation Safety Administration (NHTSA) 2004). The Insurance Institute for Highway Safety (IIHS) (2005) noted that the increase in motorcycle deaths was associated with an increase in participation of older riders and in the involvement of larger motorcycles in fatal crashes between 1994 and 2004. However, the repeal or weakening of compulsory motorcycle helmet laws in some states of the USA was identified as a large contributor to the increase in motorcycle deaths experienced in the last decade (IIHS, 2005). New motorcycle sales in the USA rose from about 300,000 per annum in 1992 to about 1 million by 2004 – annual sales doubled between 1999 and 2004 (see Motorcycle Industry Council website: [www.mic.org](http://www.mic.org)). Large capacity motorcycles, particularly cruiser style machines, dominated sales.

#### *Challenges for Road Safety Agencies*

The pattern of increased motorcycle sales and usage summarised in this paper presents a challenge to road safety agencies. Short of restricting motorcycle sales and/or usage, there are no easy means of addressing rider fatality risk. As noted in Christie & Newland (2001) there may be a need to target returning riders to encourage them to ensure that their basic riding skills (ie braking, curve riding and obstacle avoidance) are adequate for road riding in the contemporary traffic mix. Perhaps consideration should be given to the provision of short, targeted re-training for returning riders based on an early Californian remedial program shown to reduce subsequent rider crash risk (Anderson, Ford & Peck, 1980).

Given the rising popularity of scooters, particularly those in the 50cc or moped category, there may be a need to consider development of a performance/competency based assessment for moped and scooter users. In view of the seemingly different demographic group from which scooter/moped riders are drawn there may also be a need to consider the merits of a scooter-only licence or permit for those wishing to use a scooter but who have no interest in progressing to conventional motorcycle use. Road safety agencies should also consider arranging their respective registration and crash data systems to allow scooter usage and crash patterns to be more readily monitored. At present most jurisdictions include scooters with the general pool of motorcycles.

Traffic engineering/management measures to help make roads safer for motorcycle riders (eg black spot programs in Victoria) may also be worthy of consideration. Likewise, adoption of vehicle improvements likely to make motorcycles safer (eg ABS/combined/integrated front and rear wheel braking) should be pursued.

## CONCLUSION

The pattern of motorcycle use and fatality in Australia between 2001 and 2005 is similar to that summarised by Christie and Newland (2001) in respect of the decade prior to 2001. Since 2001, motorcycle sales have continued apace with older riders, particularly returning riders, still the biggest buyer and user group. Motorcycle deaths for those aged under 25 continued to fall more steeply than for riders aged over 25 years. While increasing sales are not making riders less safe, it would appear that the greater number of motorcycles, particularly larger motorcycles, traveling more collective kilometres per annum are increasing the number of motorcycle deaths in Australia. However, it is important to note that deaths per registered motorcycles and distance travelled have generally fallen across the last 15 years.

Given the continued strong sales of new road motorcycles in Australia and the relationship between motorcycle numbers, usage and crashes, the number of motorcycle deaths could be expected to rise in the next five to ten years. This presents a challenge to road safety agencies, the motorcycle industry and the general motorcycle community.

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