# OLDER MOTORCYCLISTS – AN ASSESSMENT OF THE ISSUES

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After a period of sustained reductions, motorcyclist fatalities and injuries are increasing in many developed countries. This trend reflects an increase in crashes involving older riders (defined as 25 years of age and over in some jurisdictions, higher minimum ages in other jurisdictions). Increased riding by older riders, inexperience and a pattern of recreational riding are considered to be the major contributors to the increase in crashes.

Older riders can be categorised into three groups:
1. Riders who have held licences and ridden for many years (continuing riders)
2. Riders who have held licences for many years but have returned to riding only recently (returned riders)
3. Riders who have only obtained a licence recently (new riders)

Analyses of data from Victoria, Australia, found that among riders aged 30 and over, new riders (holding learner permits or probationary licences) were involved in more casualty crashes per 10,000 licences per year than full licence holders. However, continuing and returned riders could not be separated in the crash data. For this reason, a survey of motorcycle licence holders aged over 30 was undertaken to examine the patterns of riding and crash involvement of the three groups of older motorcyclists. About half of the respondents had not ridden in the last year. Among those who had ridden, 43% were continuing riders, 27% were returned riders and 31% were new riders. The amount and patterns of riding and training history differed among these groups. Riding further per week and being ticketed for a traffic infringement were associated with crash involvement. Increasing age was protective against crash involvement.

Despite their increasing representation in crashes, older riders have fewer crashes per year and per kilometre ridden than younger riders. The implications of these paradoxical findings for rider licensing and other motorcycle safety measures are discussed.

Keywords: motorcycles; age; experience; driver licensing

## INTRODUCTION

The number of older motorcyclists killed or injured in crashes has increased in the last decade in many developed countries, including the United States (Shankar, 2001; Stutts, Foss & Svoboda, 2004), Great Britain (Sexton, Baughan, Elliott & Maycock, 2004) and Australia (ATSB, 2002). In some countries, this increase has been the main contributor to an overall rise in motorcyclist crashes. The number of motorcyclist fatalities in the United States fell from a peak of 5,144 in 1980 to 2,116 in 1996 but since then has increased steadily to reach 3,244 in 2002 (NHTSA, 2004). Shankar (2001) noted that the increase in motorcyclists killed was observed only in the 40 years old and over age group, while the number of motorcyclists killed aged under 30 declined considerably from 1990 to 1999. However, there were still proportionally more riders killed in the under 30 age group.

There has been an increase in motorcyclist casualties in Great Britain since 1996 (Sexton *et al*., 2004). During the first half of the 1990s there was a significant fall in the number of riders aged 16-24 years killed or seriously injured. Conversely, the number of 25-59 year old riders killed or seriously injured increased steadily throughout the 1990s.

In Australia, the number of motorcyclist fatalities has shown a less clear trend. It fell from a high of 299 in 1989 to 175 in 1997 and increased to 224 in 2002 before dropping back to 188 in 2003. However, since 1991 there has been a decrease in the number of riders aged under 25 killed and an increase in the number of riders aged over 25 killed. The percentage of killed riders aged over 25 increased from 49% in 1991 to 71% in 2001 (ATSB, 2002).

In the State of Victoria, the number of motorcyclists killed increased from 38 in 1999 to 64 in 2001 before stabilising at 56 in 2002 (ATSB, 2003). In Victoria, as in other jurisdictions, the involvement of "older" motorcyclists has increased since 1990. The number of riders in crashes aged 30 and over increased from 501 in 1991 to 1,120 in 2003. In contrast, the number of riders in crashes aged under 30 fell from 1,353 in 1991 to 663 in 2003. Riders aged 30 and over comprised 26.8% of riders in crashes in 1991 and this increased to 63.2% in 2003.

The trends in motorcycle involvement in crashes has mirrored changes in motorcycle registration and rider licensing. There has been strong growth in sales of on-highway motorcycles in the United States (Shankar, 2001) and in motorcycle sales in Great Britain (Sexton *et al*., 2004). The median age of owners of registered motorcycles in the USA increased from 24 years in 1980 to 38 years in 1998 (Shankar, 2001). Sexton *et al*. (2004) note that the percentage of respondents to British motorcyclist surveys who were aged less than 20 fell from 15% in a 1990 survey (Taylor & Lockwood, 1990) to only 4% in 2004.

Australia-wide data from the Australian Bureau of Statistics (ABS) Motor Vehicle Census 2002 (ABS, 2003) shows that the number of motorcycles registered increased by 18.5% from 31 October 1997 to 31 March 2002. The largest increase was in Victoria (28%), with no increases in South Australia and the Northern Territory (1.2% and 13.5% decreases). In NSW, the number of motorcycles registered to people aged 40 and over increased by 57% between 1995 and 2000, while the number of motorcycles registered to people under 25 years decreased by 33% (de Rome & Stanford, 2002). At the same time, the number of licences held by older riders also increased. In Victoria, the number of licences held by riders aged 30 and over increased from 148,000 in 1996 to 206,000 in 2001. The increase in number of licence holders was steeper for 40-49 and 50-59 year olds than for 30-39 year olds. Conversely, the number of licences held by riders aged under 30 fell marginally from 52,000 to 47,000.

Despite the increase in the involvement of older motorcyclists in crashes, a large body of research has shown that crash risks (Sexton *et al*., 2004; Mullin, Jackson, Langley & Norton, 2000) and crash rates (ATSB, 2002) are higher for younger riders. The Australian Transport Safety Bureau (ATSB, 2002) has estimated that motorcycle riders aged 17 to 25 years had 47.0 fatalities per 100 million kilometres ridden compared to 14.5 for riders aged 26 to 39 years and 7.7 for riders aged 40 years and over (based on 1998 to 2000 data).

Older riders can be categorised into three groups: (a) Riders who have held licences and ridden for many years (continuing riders), (b) Riders who have held licences for many years but have returned to riding only recently (returned riders), and (c) Riders who have only obtained a licence recently (new riders). Many in the motorcycling community have expressed concern about the safety of older, inexperienced riders but little objective data has been available to quantify these concerns.

This paper examines the crash risks of younger and older riders and compares the characteristics of three groups of older riders to assess the relative priority that should be given to addressing the problems of young and older rider crashes and whether particular subgroups of older riders should receive more attention. The examination is based on an analysis of Victorian crash and licensing data supplemented by a survey of motorcycle licence holders aged over 30 years.

## CRASH RISKS OF YOUNGER AND OLDER RIDERS

Crash and licensing data were provided by VicRoads, the driver licensing authority in the State of Victoria. The complete analyses can be found in Haworth, Mulvihill and Symmons (2002). The crashes were police-reported on-road crashes in which at least one person (often the motorcyclist) was injured or killed. A subset of the Victorian road crash database for 1991-2000 inclusive was selected by specifying that the vehicle involved was a motorcycle. Records related to pillions in crashes were excluded so that the remaining data set comprised one case per motorcycle rider involved in a casualty crash. While the motorcycle rider need not have been injured, in most cases the motorcycle rider was injured. While the resulting data set strictly describes motorcycle riders involved in crashes, rather than crashes per se, the number of crashes in which there was more than one motorcycle was very small (0.3%). Therefore, the number of motorcycle riders in crashes very closely approximates the number of crashes.

Age and licence status of the rider were recorded as at the time of the crash. Rider age was unknown for a very small percentage of riders (1.1%). In general, the analyses compare riders aged under 30 with those aged 30 and

over. The riders aged under 30 include those below licensing age. Where crash numbers were sufficiently large, riders aged over 30 were grouped into those aged 30-39, 40-49, 50-59 and 60+ years.

Given that the crash frequencies for each of the age groups varied considerably across the period 1991-2000, crash rates were calculated for individual years. Numbers of licences held were available for 1996-2001 (as at 30 June, except in 1996 when data were extracted in February). Therefore crash involvement rates could be calculated for 1996-2000.

An examination of Victorian data shows that in 2000, 180 per 10,000 motorcycle licence holders aged under 30 were involved in a casualty crash compared to 54 per 10,000 motorcycle licence holders aged 30 and over. Figure 1 shows that crash rate decreased systematically with age of the licence holder from 72 per 10,000 licence holders aged 30-39 to 25 per 10,000 licence holders aged 60 and over. It is possible that at least some of the reduction in crash rate with age reflects less riding by older licence holders.

The pattern of severity of crashes differed significantly between riders aged 30 and over and younger riders ($\chi^2(2)=29.7$, $p<.001$). Compared to younger riders, riders aged 30 and over were involved in relatively fewer serious injury crashes (39% versus 42%) and relatively more other injury crashes (59% versus 55%). The percentages of crashes that were fatal was similar (2.4% versus 2.8%). The pattern of severity of crashes also differed significantly among the riders aged 30 and over ($\chi^2(6)=16.9$, $p<.05$). The percentage of crashes that resulted in serious injury was similar for 30-39 and 40-49 year old riders but was somewhat lower for 50-59 year old riders and somewhat higher for riders aged 60 and over. However, the absolute number of crashes involving riders aged 60 and over was small, and so these differences may not be reliable.

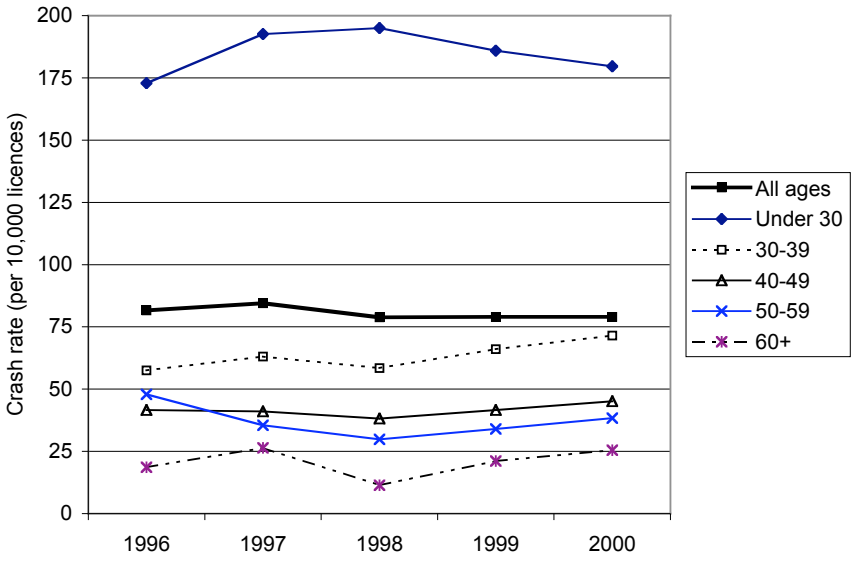


Figure 1. Casualty crash rate per 10,000 licences per year for motorcycle licence holders in Victoria, Australia from 1996 to 2000.

A second analysis estimated casualty crash rates for young and older novice and fully licensed motorcycle licence holders. For the purpose of the analysis, novices were defined as holders of learner and probationary licences. The novice riders aged over 30 are effectively the "new riders" described in the Introduction. In Victoria (at least), returned and continuing riders cannot be separated in the mass crash data or the licensing data. Thus, the fully licensed riders aged over 30 include both "continuing" and "returned" riders. The analysis (summarised in Table 1) found that the crash rate per 10,000 licences per year of novice motorcycle licence holders aged over 30 was higher than for fully licensed riders of the same group (83 versus 47). Thus, new older riders had a higher crash rate than the group comprising continuing and returned riders. Similarly, young novices had a higher crash rate than young fully licensed riders (225 versus 145). Interestingly, novices aged 30 and over had a lower crash rate than fully licensed riders aged under 30 (83 versus 47).

Table 1. Calculation of rider casualties per 10,000 licence years. Victoria 1996-2000.

| Rider type | Number of riders in casualty crashes | Number of licence years | Rider casualties per 100,000 licence years |
|---|---|---|---|
| Under 30 (novice) | 1,774 | 78,861 | 225 |
| 30+ (novice) | 266 | 32,241 | 83 |
| Under 30 (full) | 2,461 | 170,295 | 145 |
| 30+ (full) | 3,910 | 826,382 | 47 |

## SURVEY METHOD

### *Participants*

The study population consisted of holders of Victorian motorcycle licences aged over 30 years. A list containing names and addresses of 49,913 current motorcycle licence holders born before 1 January 1972 was provided by VicRoads, the driver licensing authority. The list represented a random selection of about one-quarter of the total records that satisfied this criterion. Licences that had been cancelled, disqualified or surrendered voluntarily were not included in the list. A small number of licence holders (79) was excluded from selection because their date of birth was missing, their address was missing or incomplete or their postcode was missing or not in Victoria.

A sample of 4,000 licence holders was drawn from the list. The sample was stratified in an attempt to ensure sufficient responses from licence holders aged 50 and over and for licences issued in recent years (see Table 2). The number of motorcycle licence holders aged 60 and over that could be sampled was limited by the restricted number of licences in this age range, particularly among recently issued licences. The random selection of cases function in SPSS was used to select particular licence holders from the list. Date of licence issue was not available for most licences issued prior to computerisation of licensing records in 1985. For the purpose of stratification, these licences were recoded as being issued prior to 1985. Unfortunately, it was later found that the date of licence issue recorded for many licences issued before 1985 was actually the date of reissue after computerisation. This resulted in the percentage of participants who had obtained their licence prior to 1985 being much larger than expected.

Table 2 Characteristics of the population, sample and participants.

| Age group | Percent of population | Percent of sample | Percent of participants | Year of licence issue | Percent of population | Percent of sample | Percent of participants |
|---|---|---|---|---|---|---|---|
| 30-39 | 37.8 | 26.1 | 22.4 | Pre-1985 | 28.5 | 27.5 | 64.4 |
| 40-49 | 38.3 | 26.1 | 24.1 | 1985-89 | 22.5 | 15.0 | 7.3 |
| 50-59 | 16.7 | 26.1 | 27.4 | 1990-94 | 17.4 | 15.0 | 7.1 |
| 60 and over | 7.2 | 21.6 | 24.0 | 1995-99 | 21.4 | 15.0 | 7.8 |
| Unknown | 0.0 | | 2.1 | 2000-02 | 10.2 | 27.5 | 10.0 |
| | | | | Unknown | 0.1 | | 3.4 |
| Mean age (SD) | 44.3 (9.7) | 48.9 (11.6) | 50.3 (11.8) | | | | |

Respondents who stated that they had ridden during the previous 12 months were termed ‘riders’ and classified into three groups. Continuing riders were riders who stated that they obtained their licence prior to 1995 and agreed with the statement that “I have ridden regularly ever since I got my licence”. Returned riders were riders who stated that they obtained their licence prior to 1995 and who agreed with the statement that “I rode regularly when I first got my licence and then didn’t ride much for a while and now have taken up riding again”. New riders were riders who stated that they obtained their licence in 1995 or more recently. The frequency of riding that corresponded to riding “regularly” was not defined but the frequency of current riding was addressed elsewhere in the questionnaire. Respondents who stated that they had not ridden in the last 12 months were classified as ‘non-riders’.

***Questionnaire***

In addition to demographic details, the questionnaire sought information about: (1) patterns of riding and reasons for riding in the past year and in the period since licensing, (2) types of motorcycle owned currently and in the period since licensing, (3) training undertaken in the period leading up to and since licensing, (4) crash involvement in the past five years and (5) traffic infringements in the past year.

It was expected that a large proportion of the participants would be non-riders for whom most of the items in the questionnaire would not be relevant. To encourage responding by non-riders, a section for non-riders was placed on the front page of the questionnaire. The non-rider section asked about: (1) years of issue of learners permit and licence, (2) year last rode, (3) the main reason for stopping riding, (4) year of birth and (5) location of residence. Non-riders were encouraged to complete this section only and return the questionnaire.

The questionnaire was formatted as an A5 booklet. Most questions could be answered by ticking a box or circling a number. A small number of questions required a short answer. Questionnaire responses were anonymous.

The questionnaires were mailed on 29 April 2002. Reminder letters were sent two weeks later to the entire sample with the exception of 116 licence holders whose questionnaires has already been received marked "return to sender". Questionnaire responses were entered into a Microsoft Access database and then analysed using SPSS.

The study was approved by the Monash University Standing Committee on Ethics in Research in Humans.

## RESULTS

Overall, 1,948 completed questionnaires were received, corresponding to a response rate of 48.7%. If the additional 142 questionnaires received marked "returned to sender" are excluded, the response rate increases to 50.5%. The response rate was higher for rural than metropolitan residents (59.4% versus 40.0%) and increased with age of the licence holder from 41.7% for 30-39 year olds to 54.1% for licence holders aged 60 and over. It was not possible to assess whether the response rates of riders and non-riders differed.

Both weighted and unweighted results are presented in Table 3. Generally, the results were little affected by weighting and the unweighted results will be discussed here, except where there are marked differences resulting from weighting.

Table 3 Characteristics of non-riders and new, continuing and returned riders.

| | Number of respondents | Non-riders | New riders | Continuing riders | Returned riders |
|---|---|---|---|---|---|
| Unweighted mean age | | 52.2 | 46.4 | 48.9 | 49.6 |
| Weighted mean age | | 45.5 | 41.7 | 43.6 | 43.6 |
| | | | | | |
| Age group | | | | | |
| 30-39 | 419 | 42.0% | 20.5% | 22.9% | 14.6% |
| 40-49 | 439 | 47.4% | 16.9% | 24.1% | 11.6% |
| 50-59 | 499 | 49.3% | 16.0% | 20.0% | 14.6% |
| 60 and over | 441 | 62.4% | 8.6% | 17.2% | 11.8% |
| | | | | | |
| Unweighted average % | | 50.3 | 15.5 | 21.0 | 13.2 |
| Weighted average % | | 46.8 | 17.5 | 22.5 | 13.2 |

About half of the respondents had not ridden in the last year and this percentage increased with age (see Table 3). Among the riders, 42.7% were "continuing riders", 26.7% were "returned riders" and 30.6% were "new riders". New riders were significantly younger than continuing riders and returned riders (unadjusted data,

Scheffé test new vs always p<.05, new vs returned p<.01) and were more likely to be female, single and have completed a training course (see Table 4). Continuing riders were less likely to live in the metropolitan area.

Most riders in each group rode less than 100 kilometres per week and less than 3 days per week (see Table 5). Returned riders rode less far and less often than continuing or new riders. Overall, 25.3% of riders reported riding from October to March only. Continuing riders were more likely to ride year-round than returned riders or new riders.

Table 4 Demographic characteristics of non-riders and new, continuing and returned riders.

| Characteristic | New | Continuing | Returned | Chi-square |
|---|---|---|---|---|
| Male | 82.8% | 94.4% | 96.3% | $\chi_{(2)}=37.5$, $p<.001$ |
| Unmarried | 13.1% | 8.6% | 6.4% | $\chi_{(4)}=9.7$, $p<.05$ |
| Metropolitan resident | 62.0% | 42.4% | 50.8% | $\chi_{(2)}=24.6$, $p<.001$ |
| Training course | 87.1% | 32.5% | 29.4% | $\chi_{(2)}=245.5$, $p<.001$ |
| Years since obtained licence (SD) | 2.5 (2.0) | 16.0 (11.5) | 18.1 (11.9) | |

Table 5 Characteristics of riding.

| Characteristic | New | Continuing | Returned | Chi-square |
|---|---|---|---|---|
| Distance ridden per week (kms) | | | | $\chi_{(10)}=36.9$, $p<.001$ |
| Less than 50 | 40.9 | 40.6 | 61.2 | |
| 51-100 | 25.4 | 24.6 | 16.0 | |
| 101-200 | 18.6 | 16.0 | 11.8 | |
| 201-300 | 7.9 | 9.2 | 5.9 | |
| 301-400 | 1.4 | 4.7 | 2.5 | |
| 400+ | 5.7 | 5.0 | 2.5 | |
| Frequency of riding | | | | $\chi_{(10)}=48.0$, $p<.001$ |
| Not at all/other | 3.6 | 6.0 | 8.4 | |
| 1-5 days/year | 11.4 | 13.6 | 20.6 | |
| 1-3 days/month | 27.9 | 23.0 | 34.5 | |
| 1-2 days/week | 33.9 | 24.5 | 21.0 | |
| 3+ days/week | 23.2 | 32.9 | 15.5 | |
| Main means of transport | | | | $\chi_{(4)}=32.7$, $p<.001$ |
| Mostly motorcycle | 8.6 | 12.8 | 4.6 | |
| Mostly car/other | 72.0 | 59.8 | 80.8 | |
| Mixture motorcycle and car/other | 19.4 | 27.4 | 14.6 | |
| Ride October to March only | 39.2% | 27.2% | 33.6% | $\chi_{(4)}=39.2$, $p<.001$ |

Continuing, returned and new riders all cited touring as the most common reason for riding in the last 12 months. Returned riders appeared to be less likely to use their motorcycle for commuting and general transport than continuing or new riders. Continuing riders were more likely to travel by 'mostly motorcycle' or 'mixture of motorcycle and other' than were returned riders. The pattern for new riders lay between these levels.

Riders were asked how many crashes they had been involved in while riding their motorcycles on the road in the last five years in which someone was hurt, the police were called or a vehicle was damaged to the extent that it

had to be taken away. Overall, 88.5% of riders had not been involved in a crash in the last five years, 6.7% had been involved in one crash, 1.9% in two crashes and 0.5% in three or more crashes. Similar percentages of continuing, returned and new riders had received traffic tickets or had to go to Court in the last 12 months (7.9%, 6.7% and 6.8%, respectively, $\chi\_(2)=0.38$, $p>.10$).

Univariate logistic regression showed that crash involvement was associated with riders being younger on average, riding further per week, riding more in urban areas and receiving a traffic ticket or going to Court in the last year (see Table 6). Crash involvement was not associated with being a new or returned rider (compared to a continuing rider) or gender or completing a training course. Multivariate logistic regression showed that crash involvement was associated with riding further per week, receiving a traffic ticket or going to Court in the last year and being younger (see Table 7).

Table 6 Characteristics of riders reporting involvement in a crash in the last 5 years and those not involved.

| Characteristic | Crash-involved | Non-crash involved | OR | 95% CI | p Value |
|---|---|---|---|---|---|
| Mean age | 46.15 | 48.85 | 0.978 | 0.959 to 0.998 | <.05 |
| Male | 95.7 | 91.5 | 2.034 | 0.727 to 0.5692 | >.10 |
| Distance ridden per week (km) | | | | | |
| Less than 50 | 29.0 | 47.0 | | | |
| 51-100 | 20.4 | 22.7 | 1.459 | 0.793 to 2.685 | >.10 |
| 101-200 | 22.6 | 15.3 | 2.394 | 1.312 to 4.370 | <.005 |
| More than 200 | 28.0 | 15.0 | 3.010 | 1.698 to 5.335 | <.001 |
| Group | | | | | |
| New | 30.9 | 30.9 | 1.124 | 0.648 to 1.950 | >.10 |
| Continuing | 38.3 | 43.2 | | | |
| Returned | 30.9 | 25.9 | 1.344 | 0.772 to 2.341 | >.10 |
| Urban riding | 4.90 | 4.25 | 1.102 | 1.015 to 1.196 | <.05 |
| Traffic infringement | 21.5 | 6.0 | 4.302 | 2.441 to 7.579 | <.001 |
| Training course | 52.7 | 45.5 | 1.338 | 0.867 to 2.063 | >.10 |

Table 7 Multivariate logistic regression results.

| Characteristic | OR (adjusted) | 95% CI | p Value |
|---|---|---|---|
| Mean age | 0.976 | 0.955 to 0.998 | <.05 |
| Distance ridden per week (km) | | | |
| Less than 50 | | | |
| 51-100 | 1.430 | 0.761 to 2.689 | >.10 |
| 101-200 | 2.145 | 1.139 to 4.039 | <.05 |
| More than 200 | 2.316 | 1.227 to 4.371 | <.05 |
| Urban riding | 1.042 | 0.948 to 1.145 | >.10 |
| Traffic infringement | 2.762 | 1.501 to 5.081 | <.005 |

## DISCUSSION AND CONCLUSION

The age distribution of motorcycle riders and riders in crashes has been changing. While most riders and crashed riders were young (under 25 or 30 years of age) in the 1980s and before, now the majority of riders and crashed riders are older. Despite their increasing representation in crashes, the analyses reported here confirm earlier research that older riders have a lower crash rate than younger riders, whether the rate is expressed in terms of licences held or distance travelled. In addition, crashes of older riders are less severe than those of younger riders (perhaps with the exception of riders aged over 60 as shown in the Victorian data and also reported by Stutts *et al*., 2004).

Older riders can be categorised into three groups: (a) Riders who have held licences and ridden for many years (continuing riders), (b) Riders who have held licences for many years but have returned to riding only recently (returned riders), and (c) Riders who have only obtained a licence recently (new riders). Many in the motorcycling community have expressed concern about the safety of older, inexperienced riders but little objective data has been available to quantify these concerns. The survey reported here confirms the existence of the three groups. Among those who had ridden, 43% were continuing riders, 27% were returned riders and 31% were new riders. The amount and patterns of riding and training history differed among these groups.

The analysis of crash and licensing data from Victoria found that new riders aged 30 and over (holding learner permits or probationary licences) were involved in more casualty crashes per 10,000 licences per year than full licence holders (who could be continuing or returned riders). However, these crash rates do not take into consideration differences in the amount of riding of new, continuing and returned riders.

In the survey, riders were asked how far they rode in an average week and how many road crashes they had been involved in while riding their motorcycles on the road in the last five years. The reported numbers of road crashes in the past five years did not differ significantly among continuing, returned and new riders, although many new riders had not ridden for the whole five years. However, returned riders did not ride as far as continuing or new riders.

Univariate logistic regression showed that crash involvement was associated with riders being younger on average, riding further per week, riding more in urban areas and receiving a traffic ticket or going to Court in the last year. Crash involvement was not associated with being a new or returned rider (compared to a continuing rider) or gender or completing a training course. Multivariate logistic regression showed that crash involvement was associated with riding further per week, receiving a traffic ticket or going to Court in the last year and being younger. These results agree with those of Sexton *et al*. (2004) who found that the sex of the rider, whether the rider had undertaken compulsory basic training or whether the rider had 'taken a break from riding' did not enter their model of accident involvement as statistically significant variables. Sexton *et al*. note that a short-term effect of returning to riding may exist and that their study was not able to rule this out.

Thus, the dilemma for policy and programs in motorcycle safety is the extent to which resources should be directed to the large and growing problem of crashes involving older riders for whom the individual risk is lower or to the smaller and decreasing problem of crashes involving younger riders for whom the individual risk is much higher.

### *Implications for rider licensing and other safety measures*

As for any road user group, the crash involvement of motorcyclists may be reduced by measures that reduce exposure and by measures that reduce the risk per unit of distance travelled, including general road safety measures.

Current rider training programs for younger or older riders do not appear to reduce crash risk. The evidence suggests that voluntary training programs may increase crash risk (TOI, 2003). Compulsory training through licensing programs produces a weak but consistent reduction in crashes (TOI, 2003) but much of this effect may result from reductions in exposure, rather than crash risk per distance travelled.

The current licensing systems in Australian states and in many other jurisdictions appear to encourage dormant licence holders to return to motorcycle riding because the licence to ride a motorcycle remains current as long as a car licence is held. Implementing a system in which there is an active requirement to maintain the currency of a motorcycle licence has the potential to reduce exposure and to ensure that those individuals wishing to return to riding have to regain a minimum level of skill or competence before doing so. This would have the added

benefit of improving the ability to estimate the real number of riders and therefore, the ability to monitor trends in motorcycle safety.

Mandating refresher courses for licence holders returning to riding could reduce exposure by demonstrating to potential riders that their skills may be inadequate. However, the ability of such courses to reduce the risk per unit of distance travelled remains to be demonstrated.

The crash involvement of motorcyclists could also be decreased by general road safety measures that would benefit riders of all ages. These measures could include reductions in impaired driving and other unsafe road user behaviours by car drivers, reductions in both speeding and general travel speeds and improvements in roadside safety to prevent injury or reduce injury severity in the event of a crash.

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