



# **The Role of Maryland's Motorcycle Rider Course in Promoting Safer Behaviors and Attitudes**

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**Baltimore, Maryland**  
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### Technical Report Document Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle The Role of Maryland's Motorcycle Rider Course in Promoting Safer Behaviors and Attitudes		5. Report Date	
		6. Performing Organization Code	
7. Authors Carrol S. Perrino, Ph.D., Ashraf Ahmed, Ph.D., Ann Callender, MA, Elizabeth Roger, BS, April Cantwell, BS and Oryne Stewart, BS		8. Performing Organization Report No.	
9. Performing Organization Name and Address National Transportation Center Morgan State University 1700 E. Cold Spring Lane Baltimore, MD 21251		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No.	
12. Sponsoring Organization Name and Address Maryland Motor Vehicle Administration and National Transportation Center (NTC) of Morgan State Univ.		13. Type of Report/Period Covered Final Report	
		14. Sponsoring Agency Code Final Report	
15. Supplementary Notes			
16. Abstract This study was designed to assess the effects of Maryland Motorcycle Rider Course on safer riding behaviors. To this end, new motorcycle licensures were identified in 1998 and 1999 after either participating in and passing the Maryland Motorcycle Rider Course, trained status or passing the riding and written tests, untrained status. A structured interview was conducted at one-year intervals eliciting information about riding exposure, purpose, habits, practices, self-reported accidents, use of safety equipment, risky riding behaviors, and law-breaking behaviors. The trained participants were also asked to evaluate the influence of the course on their riding experiences over the past year and their suggestions for improvements. The results indicate that more females represented in the trained condition and more experienced riders present in the untrained condition. After licensing there was no difference in exposure. There was no significant difference in accidents, self-reported or police reported as a function of training status. The trained males reported significantly higher compliance in the use of safety gears and lawful behaviors. The trained respondents reported after one year of riding that the Maryland Motorcycle Riding Course had proven most useful although course improvement especially an on-road training component were suggested.			
17. Key Words Motorcycle Rider Course, training, safety gears, accident, violations, behaviors and attitudes		18. Distribution Statement No restrictions. This document is available to the public from the:  National Transportation Center Morgan State University 1700 E. Cold Spring Lane Baltimore, MD 21251	
19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price





## **ACKNOWLEDGMENTS**

This research project was completed in pursuant to a contract with the Maryland Motor Vehicle Administration (MVA) and with the support of the National Transportation Center (NTC) of Morgan State University. We wish to thank Elizabeth Callendar-Smith, Debbie Statom, and Raina Johnson for their efforts in data collection and data processing. We would like to express our gratitude to Dr. Z. Andrew Farkas, NTC Director, for his guidance throughout the project. We deeply appreciate the help of Mrs. Tawanda Carter and Mrs. Anita Jones for their cordial support of project activities. Thanks are also due to Mrs. Karron Davis Minor for her editorial services. We also acknowledge, with gratitude, the many services received from Mr. Andrew Krajewski, Mr. Nelson Gretsinger and Mrs. Jane Valenzia of MVA for the project.



## EXECUTIVE SUMMARY

In 1985, the Maryland Motor Vehicle Administration (MVA) created a training program for new motorcycle licensures known as the Maryland Motorcycle Riders Course (MRC), a course for beginners. This service has been offered in training sites across the state. Maryland bears a share of the expenses related to the training, which is about 10 percent, with a trainee paying a \$100 dollar fee. The Maryland MVA was interested in knowing how this course contributed toward the road safety of motorcycle riders as well as other motorists, and this study was designed and conducted to address this issue. The MVA and the National Transportation Center (NTC) of Morgan State University jointly funded the project, a three-year study with annual follow-ups.

New Class M licensures, the license type for motorcyclists, were identified in 1998 and 1999, and then interviewed with a structured questionnaire one year later. The interview was done through a mailed questionnaire or a telephone interview. Those respondents in the 1998 Cohort were interviewed again, two years after licensure.

Among the respondents, approximately a quarter of the riders were found to be below age 30 while 40 percent were above the age of 40. Gender composition of the riders who were trained and untrained was quite different—the percentage of untrained females was much smaller than that of the beginner trained female riders.

The prior riding experience of the untrained riders was much higher than the trained. After licensure, however there was little difference in exposure, indicating an increased confidence in riding after participating in the training program.

With regard to riding purpose and practices, about 90 percent of riders ride primarily for recreational purposes, which was a little higher for beginners. A slightly higher percentage of untrained riders use their motorcycles for work purposes. The percentage of those riding alone was higher among the untrained while riding with someone was higher for beginners. Most of the riders ride “on-road,” and primarily in the country or suburbs.

In terms of the incidence of motorcycle crashes using both self-reported and Maryland State Highway Administration (SHA) data, there was no significant difference between the untrained and trained riders. However, untrained riders were more likely to have moving violations than the trained riders. The trained riders reported significantly higher compliance in using safety gear and following the law, obtaining insurance and not drinking and riding. Trained riders also reported fewer examples of risky behavior such as exceeding the speed limit, following too closely and passing vehicles improperly but again, the differences were not statistically significant.

One year after the MRC experience, most of the respondents reported that the MRC training was very useful, and about a quarter suggested course improvements such as introducing on-road training as a component.

In conclusion, although there was no difference in crashes in terms of training status, either in the self-reported or in the administrative data, the training did contribute to enhanced use of safety measures by motorcyclists such as increased use of safety equipment, reduction in risky behavior on the road and reduction in law breaking behavior.

The MRC program should not be evaluated by a single factor, crash incidence. The program should be made easily accessible to all novice riders, and the curriculum carefully examined to strengthen those components that directly enhance safe riding practices and reduce risky and unlawful behavior. Consideration might be given to developing refresher courses to deal specifically with the changing riding environment.

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## Chapter I

# INTRODUCTION

### Background

The risk of motorcycle riding has been clearly documented in a 10-year study of motorcycle fatalities, 1990 – 1999 (NHTSA, 2001). The 1998 Fatality Analysis Reporting Systems (FARS) data revealed an 18 fold risk per registered vehicle and a 3.6 fold risk per vehicle mile traveled for motorcycle fatalities when compared to passenger car fatalities. From 1980 to 1997, the motorcycle fatalities show a declining trend; however, after 1997, the fatalities have increased. Motorcycles comprised 2 percent of registered vehicles but constituted 5.5 and 5.9 percent of fatalities in 1998 and 1999 respectively.

In Maryland, motorcycles represent 1 percent of the state's registered vehicles, but motorcycle fatalities were 5.6, 7.7 and 8.6 percent of the fatalities for 1998, 1999 and 2000, respectively. Maryland accident data of past seven years show an increase in motorcycle crashes in recent years (see Figure 1; Maryland State Highway Administration, July 2001). The cost of these crashes, injury and property, was estimated at 219 to 301 million dollars or approximately \$226,000 to \$259,000 per accident. In 1985, the Maryland Motorcycle Rider Course (MRC) was introduced to beginner riders and was developed to promote safe riding. Currently conducted from April through October at 15 different sites throughout the state, with eight classroom hours of instruction and 12 hours of on-range experience, the MRC has graduated more than 50,000 riders. Passing the course has guaranteed licensure since October 1997. The course is mandatory for those younger than 18 who desire motorcycle licensure. A much larger number of riders have been licensed in Maryland after passing the written and skills tests at Motor Vehicle Administration sites, but have not taken the MRC. Does the Maryland MRC promote safe riding practices and behaviors?

## **Literature Review**

There has been little evidence of a substantial reduction in either crashes or violations as a consequence of taking a motorcycle safety course in a number of states or abroad. Certainly, some of the studies have methodological flaws stemming from inherent differences in those who choose to take or not take a safety course. But, even in those studies that controlled group membership via matching, positive results are “underwhelming” (Billheimer, 1998; Davis, 1997; Jonah, Dawson and Bragg, 1982; McDavid, Lohrman and Lohrman, 1989; Mortimer, 1984, 1988 and Nairn, 1993). Effect size may be small; power inherent in the analyses may be low; or both may be at work. It has been suggested that the results of participation in a safety course may produce behavioral and attitudinal changes that have not been measured in the previous research (Nairn, 1993). These changes are certainly measurable and that, in fact, is the focus of the present research.

Other methodological issues besides the equivalence of the riders in the two conditions must be considered. Certainly, there are obvious differences in course characteristics such as the duration of the course. British Columbia conducted a 37-hour course (McDavid et al) as compared to Illinois’ 20-hour course (Mortimer, 1984). Less obvious is the possibility that membership in the training conditions, specifically the untrained condition, might change over time. With most studies typically lasting from one to five years, this might also prove troublesome in making comparisons between the two conditions.

To detect membership shifts, the methodology would have to include follow-up evaluations. Most studies, however, determine initial condition assignment and then follow official record data evaluating subsequent accidents and or citations (Mortimer, 1984; and McDavid et al). There would be no opportunity to detect a change if previously untrained riders decided to receive some type of safety training. Billheimer used a telephone survey to interview his untrained as well as trained riders after selection for participation in the study. A subsequent mail survey was also conducted, but no mention was made in any change in training status over the two-year evaluation period. In the

present study, assuring reliability of training status was achieved in this quasi-experimental design via subsequent mail and or telephone surveys.

### **Objectives of the Study**

Keeping the above knowledge and experience in the backdrop, this study was designed to evaluate the overall effect of the Maryland MRC in promoting safer behaviors and attitudes. The specific objectives are:

- 1) To assess the characteristics of trained motorcyclists;
- 2) To assess the role of training in the incidence of crashes and citations;
- 3) To assess whether training influences risky riding, unlawful behavior and the use of safety gear; and
- 4) To assess perception of the MRC training experience

## Chapter II

# METHODOLOGY

### **Design**

Two cohorts of participants were obtained: the first during the 1998 riding season, July through October, and the second from the 1999 riding season, May through October. A baseline survey instrument was administered to those who came to participate in the MRC and those who appeared at MVA licensing sites to test for their Class M licensure without formal training. For each cohort, a follow-up interview, either by telephone or mail, was conducted to determine events, behaviors and attitudes one year after the initial evaluation. Finally, the members of the 1998 cohort were surveyed after their second year. This prospective study combined longitudinal and cross-sectional features and included a variety of measures (self-reported accidents, costs of accidents, continual licensure status, insurance status, motorcycle ownership or intended ownership, exposure measures, use of protective gear, alcohol and riding, riding locale, riding purposes, riding behaviors and MRC evaluations for those in the trained condition). Police-recorded accidents and citations as well as licensing information were also obtained. Models developed from the first cohort were validated on the second cohort.

### **Materials**

For the baseline measurement, a survey, Motorcycle Safety Study Questionnaire, was administered. This instrument ensured confidentiality and asked for assistance in providing the Maryland MVA information that might prove important for motorcycle safety. Respondents were assured that their responses would not influence their licensing. The information collected included age, gender, years of vehicle licensure, license categories, prior riding experiences, average annual miles ridden, prior motorcycle accidents and their severity, other types of vehicular accidents, estimated risk of having a motorcycle accident in the next 12 months, current motorcycle ownership, and future motorcycle exposure. Finally respondents were asked would they be willing to participate in future surveys conducted over the next two years. If they agreed, they were asked to record their names and telephone numbers and were thanked for their cooperation.

For Follow-up I, the Maryland Motorcycle Safety Study Questionnaire: The First Follow-up, was either administered via telephone or through the mail to those who had supplied information during baseline and indicated a willingness to participate in future surveys. Questions elicited information about riding exposure during the previous year, formal motorcycle training in Maryland or elsewhere, primary purpose and location of riding, current motorcycle ownership, motorcycle licensure status, insurance status, frequency of use of protective gear, motorcycle accident information (severity, medical cost, repair costs) other types of vehicular accident information, use of alcohol and or drugs when riding, and MRC evaluations and suggestions for course improvement from those in the beginner training condition. For Follow-up II, the Maryland Motorcycle Safety Study Questionnaire: The Second Follow-up, was administered through the mail to those who had supplied information during Follow-up I. Questions included those from Follow-up I dealing with use of safety equipment, riding behavior, motorcycle ownership, accident involvement and risky riding behavior.

### **Procedure**

Cohort I was administered the initial questionnaire to obtain baseline data during the 1998 riding season and Follow-up I survey beginning in July 1999 and continuing until January 2000. Each respondent was approached by telephone during the late afternoon and early evening hours. If the respondent was not contacted after three attempts, a questionnaire was mailed to the respondent's home. All respondents were assured confidentiality and thanked for their participation. The Follow-up II survey was mailed beginning in August 2000 and information recorded during September – December 2000.

Cohort II was administered the initial questionnaire to obtain baseline measurements during the 1999 riding season and the Follow-up I survey, via mail and telephone, beginning in July 2000. Each respondent was mailed a survey and those who did not return the questionnaire within six weeks were contacted by telephone. Three attempts were made for each contact. The self-reported data from the telephone or mail surveys were combined with state accident and driver record data for analyses. Behavioral and

attitudinal comparisons were made for the Maryland beginner trained and untrained riders and prediction models were constructed for the accident data for each cohort.

## **Chapter III**

### **RESULTS**

#### **Sample of New Licensures**

##### **Baseline**

Analysis of the baseline questionnaire and accident data indicated the typical differences noted in the literature between those in trained and untrained conditions (see Perrino, Ahmed, Cantwell and Callendar, 1999 for a complete presentation of the data). Most interestingly, the untrained riders reported more motorcycle riding experience and less automobile experience when compared to the trained participants. Male riders reported having more riding exposure, owned more motorcycles and more accidents both on motorcycles and in cars than their female counterparts. However, controlling for riding exposure, only car accidents proved significantly greater for the males with the risk of a car accident four times greater for males than of females.

##### **Follow-ups**

Of the original Cohort I, 2144 were available for the Follow-up I survey. Of these, 664 were contacted by telephone and only 5 percent refused to complete the survey. Of the remaining potential participants, 1244 were sent a questionnaire via the mail and 439 responded, a response rate of 32 percent. This resulted in a sample of 1075, 50 percent of the original sample. For Cohort II, 2601 were available for the Follow-up I survey. The number of riders contacted by mail was 644 and by telephone, 223, a greater than 33 percent response rate.

It must be noted that there was a change in status of more than 100 riders originally considered untrained from the baseline survey in both cohorts. Only with extensive questioning about previous formal training in Maryland, as well as out-of-state and in the military, did the change of status become evident. Because the focus of the present study was the Maryland MRC, these individuals were either included in the trained condition if they had just participated in the course or were excluded from the present analyses if they had been trained in other venues. For both cohorts, this reduced the size of the untrained condition. To increase the size of the untrained group, the Maryland Motorcycle Safety Study Questionnaire: First Follow-Up, was mailed to 2000 individuals in January 2000

and another 2000 in January 2001, all of whom were identified by Maryland MVA as having obtained their motorcycle license in either 1998 or 1999 but were not listed as participants in the Maryland MRC. Twenty-five percent responded to each survey and this increased the size of the untrained condition to 341 for Cohort I and 268 for Cohort II. Again as in the original Follow-up I survey process, many of the riders identified as untrained by MVA records actually had received training either in other states or in the military and were not included in the untrained condition. There were 1300 participants in Cohort I and 1299 in Cohort II available for study in Follow-up I. For Follow-up II, 463 responded to the mailed survey in Cohort I, a 36 percent response rate.

### **Demographics**

Characteristics of the riders in the untrained and beginner trained conditions are presented in Table 1 for both cohorts. The largest percentage of riders was between 30 and 39 with mean age in the late 30s for all conditions. About 15 percent of the riders were 50 or older. While about one-third of the beginner trained riders were female, fewer untrained riders were women. Class C licensure data indicates considerable vehicular experience and it is quite similar for all conditions.

### **Riding Pattern**

Table 2 shows that the untrained riders reported having more riding experience before licensure than those in the trained condition. Cohort I untrained riders were more experienced than Cohort II untrained riders. Almost half of the untrained riders and three-fourths of those in the trained condition reported riding less than 500 miles annually. In the year following licensure, the trained riders increased their exposure about three times as much as the untrained riders. Cohort I members, both trained and untrained, reported riding an average of a little more than 3000 miles after licensure while Cohort II members rode almost 1,000 miles less. Finally, Table 3 shows that participants reported riding primarily for recreational purposes, alone or with another, and that most riding occurred on-road in the country or suburbs.

The motorcycle riding pattern varies substantially by age and training status. From the baseline survey of the 1998 cohort, the untrained riders are found to have a higher



average miles ridden than the trained. The difference increases as age increases. The relationship was more apparent in the 1999 cohort. Only a small percentage of the beginner trained riders had extensive riding experience and those were mostly older in age. However, during the first year after training and licensure, this difference disappears in both cohorts.

### **Motorcycle Ownership**

Motorcycle ownership varies substantially by training status, age and gender. While more than 50 percent of the untrained riders owned a motorcycle at the time of licensure, it is slightly less than 50 percent for the beginner trained. Over 50 percent of the males reported owning a motorcycle while it is less than 50 percent for the females. The gender differences remain the same even after controlling the training status. The percentage of participants who owned a motorcycle was found to be higher among new licensures age 35 or older (see Figure 2).

### **Accidents**

The self-reported accidents are presented in Table 4. Looking at the relationship of accidents and prior riding experience, the untrained riders reported more accidents with greater riding experience, the reverse for the trained riders. However, this is not statistically significant using chi square analysis,  $p < .05$ . For riding during the past year, the greater the exposure, the greater number of reported accidents for both untrained and trained riders. This same pattern persists for both cohorts. Accident rates whether per 100,000 vehicle miles traveled or per 100 registered motorcycles were higher for the trained as compared to the untrained riders. Using a Poisson regression to test the difference in rates, the accidents per 100,000 VMT was found to be 9 percent higher for the beginner trained riders and 6 percent higher using the per 100 vehicle owned rate for Cohort I. These differences in rates were not significant using the asymptotic standard error. (Agresti, 1996) For Cohort II, the accident rate per 100,000 VMT was 53 percent higher for the trained compared to the untrained and 45 percent higher for the trained compared to the untrained using accidents per 100 owned vehicle. Again, the differences in rates for the two training conditions were not significantly different.

A logistic model was developed using Cohort I data and validated on Cohort II. Potential predictors of self-reported accidents included gender, age (under 21, 21-29, and 30 and older), prior riding experience (0-499 and 500 or more miles), riding exposure during the past year (0-499 and 500 or more miles) and training status (untrained and beginner trained). Only age and riding during the past year proved significant for both cohorts. (see Table 5) The younger riders, under 21 for Cohort I and 21-29 for Cohort II were significantly more likely to report an accident during the past year when compared to those riders 30 years or older. Similarly for both cohorts, the odds were significantly less of reporting an accident during the past year if exposure was less than 500 miles when compared to 500 miles or more exposure. Training status was not a significant predictor of self-reported accidents for either cohort. Both models yield significant chi square tests,  $p < .001$  of the model coefficients with overall percentage correct of 93 percent for both cohorts. However, prediction of accidents, the more infrequent event, is very poor, the Nagelkerke pseudo R square = .04 for both cohorts.

Incorporating the use of safety equipment, risky behaviors and unlawful behavior in the model to predict self-reported accidents produced no significant changes for the 1998 Cohort. However, when risky behavior were introduced into the model for the 1999 Cohort, there was a significant change with chi square for this second block,  $\chi^2 = 12.855$ ,  $p < .002$ . The model fit remained at 93 percent correct and Nagelkerke R square increased from .04 to .08 with the addition of these attitudes and behaviors. The new model is presented in Table 6.

Police recorded accidents from the State Highway Administration (SHA) database are presented in Table 7. Officially reported accidents are approximately one-third of those that were self-reported. For the 1998 Cohort, the untrained riders have more recorded accidents with greater prior riding experience while the beginner riders produced a similar number of accidents regardless of prior riding experience. For the 1999 Cohort, the untrained riders produced more accidents with greater prior experience but the reverse occurred for beginner riders. As was seen with the self-reported accident data, the greater the exposure during the past year, the greater the number of accidents. This can be readily

seen for both training conditions and both cohorts. None of these relationships is significant. Using accidents per 100,000 VMT, the rate for beginner riders is 9 percent higher than that for untrained riders. The accidents per 100 owned vehicle for beginner riders is 8 percent higher than for untrained riders. The very small numbers make testing significant differences suspect. For the 1999 Cohort, the accident rate per 100,000 VMT is 25 percent higher for the untrained as compared to the beginner-trained riders and 21 percent higher for the untrained as compared to the beginner-trained riders using accidents per 100 vehicles owned. The most common type of accident was found to be 'single vehicle accident' in both the cohorts, followed by, 'same direction rear end hit' and 'straight movement angle'. Most of these accidents occurred during the day and most of them did not have any evidence of drinking alcohol.

### **Citations**

Looking at Table 8, the percent of citations for moving violations recorded for untrained and beginner trained riders is the same, 14 percent for Cohort I. While the overwhelming majority received no citations, only a small percent received just a single citation. For Cohort II, beginner trained riders received fewer moving citations than the untrained riders although, again, most received no citations. A similar pattern was also observed at the second follow-up of the 1998 Cohort, Table 9. A similar pattern of differences is also observed with mean number of citations, ranging from a high of 0.20 for untrained to a low of 0.11 for the trained (see figure 3). The most common type of citation was speeding, 10 mph above the limit, and the next common was disobeying the traffic signs. The results thus indicate that the beginner trained riders in general have fewer moving violations than the untrained, indicating a higher compliance to traffic laws.

### **Use of Safety Equipment**

#### **Follow-up I**

Failure to wear protective gear including a full or partial helmet, long pants, gloves, boots, a jacket, bright clothing and an eye shield has been identified as risky behavior. Wearing these items, all or most of the time, was determined for untrained and beginner trained riders. The results are presented in Table 10. For Cohort I, about 75 percent in both groups report wearing a full helmet and 25 percent a partial helmet. In Cohort II, 71

percent report wearing a full helmet while 29 or 30 percent wore a partial helmet. These percentages reflect the success of the mandatory helmet law in Maryland. Long pants and an eye shield are reported as “used most of the time” although the trained riders adhere more frequently to these practices. Bright colored clothing to increase conspicuity is reported worn least frequently; however, the practice is over 50 percent higher for the trained than the untrained riders. The trained riders also report the use of boots, gloves and jacket most frequently; the percentages of these are about 24 to 40 percent higher for the trained riders compared to the untrained. A score was computed by weighting each frequency of response, never to always, from 0 to 3 and summed for each rider. For both cohorts, the mean scores are higher for the trained riders, and the differences statistically significant using t-tests for independent groups.

#### **Follow-up II**

Looking at Table 11, the continued use of safety equipment during the second year for the 1998 Cohort is evident. Helmet use (full and partial) remained high for both groups. Use of bright and colored clothing to attain conspicuity did remain the least observed practice. As with the first year, the beginner trained reported significantly higher use than the untrained riders.

#### **Risky Behaviors**

##### **Follow-up I**

A set of risky riding behaviors is presented in Table 12 with comparisons of untrained and trained riders. The untrained riders consistently reported performing these behaviors some of the time, most of the time or all of the time more frequently than the trained riders. Exceeding the speed limit was the most frequently reported behavior for both groups. Responses were weighted from 0 to 3 and summed for each rider. For both cohorts, the mean score was higher for the untrained riders but the differences were not statistically significant, using t-tests for independent groups.

##### **Follow-up II**

Table 13 reflects the consistent pattern of speeding evident during this second year after licensure. If anything, it is higher than that reported during the first year with the

untrained riders reporting more frequent speeding than the beginner riders. “Following too closely” was also reported more frequently during this second year than in the first with the untrained riders reporting higher frequencies than the beginner riders. Passing vehicles improperly and running lights and stop signs did not show an increase. Although the percentages were consistently higher for the untrained riders, there was not a significant difference in the mean risky riding scores between the two conditions.

### **Law Breaking Behavior**

#### **Follow-up I**

Behavior defined as breaking the law, such as riding without insurance, drinking and riding and riding without having a valid motorcycle license, is presented in Table 14. In Cohort I, drinking and riding reported by untrained riders reached the highest level, 21 percent. This was twice as high as that reported by the trained riders, but this behavior was not reported at that high level among the untrained riders in Cohort II. Except for that specific example, the occurrence of law breaking behavior was greater for the untrained riders in both cohorts. Only drinking and riding for Cohort I and riding an uninsured motorcycle for Cohort II proved significant, using chi square analyses.

#### **Follow-up II**

Table 15 contains two behaviors of interest in this second year, riding an uninsured motorcycle and drinking and riding. Few participants reported riding uninsured, but 14 percent of the untrained as well as beginner riders reported drinking and riding. This percentage has remained constant for the beginner riders but shows a decrease from the 21 percent of the untrained riders who reported drinking and riding during the first year.

### **Perceptions of Maryland MRC**

Looking at Table 16, it is obvious that 99 percent of the riders who have taken the MRC in Maryland believe that the particular skills they were taught were clearly presented and have proven helpful in their subsequent riding experiences. Large percentages of these riders also report that the course was helpful in achieving the goal of safe riding and that their skills improved after taking the course. One fourth or more made suggestions, the most frequent being that of providing on-road experience in traffic. Each section was

rated from 1 to 5 and the riding section was rated as significantly more helpful than the classroom portion, using t-tests for independent groups. Table 17 shows that 94-99 percent of MRC participants believed that skills taught in the course proved helpful during their past of riding.

## Chapter IV

### DISCUSSION AND CONCLUSION

Evaluation of riding behaviors and attitudes after licensure reveals some very interesting findings. The changing status of the untrained riders has to be considered. Many of the riders initially were labeled untrained then during the subsequent two years of the study received MRC training. Also, upon questioning, many first considered untrained were found to have been trained either in the military or in other states. This points out the need to monitor training status over the course of a multi-year evaluation.

Initially, the comparison of the untrained and trained riders revealed differences (Perrino et al). The untrained group of riders were the more experienced riders. However one year after licensure, both owned bikes in similar percentages and rode a similar number of miles for primarily recreational purposes on country and suburban roads. Because exposure had increased considerably for the initially less experienced trained riders, higher accident rates might very well be expected. The logistic model constructed to predict accidents features a significant effect of current miles for both cohorts. Those riding less than 500 miles during the year after licensure have a 30 percent lower chance of reporting an accident than those riding 500 or more miles. Perhaps the lessons and experiences in the MRC help to lower what would be a much higher accident incidence for this population.

The models developed to predict accidents also indicate the role of age. Riders younger than 30 have a two or three times higher probability of having an accident than those 30 or older. Again, because the course is mandatory for the youngest riders (those under 18 years of age), the accidents reported by the MRC-trained riders may actually be lower than what would occur in the absence of those experiences.

Use of safety equipment and risky behavior also serve as significant predictors of accidents, at least for the 1999 Cohort. Beginner riders report significantly higher use of

safety equipment than the untrained riders and lower risky behaviors although not significantly so.

Other behaviors associated with training status--law breaking behavior, drinking and riding and not insuring one's motorcycle--brings into focus some interesting attitudes that might affect safety although they did not prove to be significant predictors of accidents for either cohort. It must be pointed out that there is no difference in reported use of a full or partial helmet by the two groups. The significant differences in drinking and riding and obtaining insurance may indicate the presence of a rule-breaking attitude noted as important in predicting accidents for young British motorcyclists (Rutter, Quine and Chesham, 1995). This is not a very young group of riders but perhaps the age association might be investigated in future studies.

The MRC evaluations after a year of riding experience may prove helpful in modifying the course. Currently, the Maryland MVA has added on-road and in-traffic experiences for riders in three sites and their reactions should be recorded. Perhaps this will prove helpful in reducing riding accidents during the crucial first year for these inexperienced riders. Analysis of the course curriculum in light of changing road conditions and motorcycle design might identify additional skills and experiences that could be added to the course for accident avoidance. Currently, there is discussion of the problem presented by heightened lips on roads and how riders might deal with this. Could these techniques be incorporated in the course? Should additional short refresher courses be added, especially during the first year, to enhance skill level? The extremely high ratings for the two sections of the course and the overwhelmingly large percentages of riders who perceived the course as helpful in skill acquisition as well as skill improvement underscores the benefits of conducting this type of program. Currently, the MRC in Maryland is oversubscribed and that is a direct result of word-of-mouth recommendations. It is a rare product that receives this type of rave review.

Finally, the substantial proportion of both groups who drink and ride underscores a recognized risk factor for motorcycle fatalities. This should be addressed independently



with the analysis of blood alcohol levels in all accident reports over an extended period of time. Experimental manipulation of alcohol levels and motorcycle skill should be evaluated. The one drink or more reported by those participants may prove more incapacitating than previously recognized. The unit on drinking and riding included in the current MRC might be strengthened to have a greater impact on attitudes and behaviors, and a campaign specifically focused on riders might be instituted.

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**Table 1**

**Demographics by Training Status**

<b>Characteristic</b>	<b><u>Untrained</u></b>		<b><u>Beginner Trained</u></b>	
	<b>1998</b>	<b>1999</b>	<b>1998</b>	<b>1999</b>
	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>
<b>Gender</b>				
Male	84	91	67	67
Female	16	9	33	33
N	330	268	969	815
<b>Age</b>				
Below 20	2	1	6	4
20-29	20	25	22	27
30-39	32	34	38	32
40-49	33	23	20	24
50-59	9	14	11	10
60-69	3	2	3	2
70 & Over	1	1	1	1
Mean Age	38.4	37.5	36.6	36.5
N	330	250	966	787
<b>Years Licensed C</b>				
Less than 1 Year	0	1	1	1
1-4	6	8	4	7
5-9	9	16	9	10
10-19	29	33	33	30
20-29	37	25	30	28
30-39	14	10	16	18
40-49	4	5	5	5
50 & Over	1	2	2	1
Mean Years	20.3	18.6	20.8	20.0
N	224	171	792	588

**Table 2**

**Riding Exposure by Training Status**

Characteristic	Untrained		Beginner Trained	
	1998	1999	1998	1999
<b>Prior Annual Miles</b>	%	%	%	%
<b>Less Than 499</b>	27	44	38	75
<b>500-999</b>	11	8	15	5
<b>1000-1499</b>	13	13	8	5
<b>1500-1999</b>	3	3	4	1
<b>2000-2999</b>	13	9	9	5
<b>3000-3999</b>	7	6	7	2
<b>4000-4999</b>	5	3	3	1
<b>5000-5999</b>	10	6	7	2
<b>6000-7999</b>	2	1	3	2
<b>8000-9999</b>	3	2	1	1
<b>10000-11999</b>	3	2	3	0
<b>12000 and more</b>	4	3	3	1
<b>Mean</b>	2189.4	825.6	2700.4	1912.6
<b>N</b>	249	250	481	762
<b>Past Year Annual Miles</b>				
<b>Less Than 499</b>	21	40	19	34
<b>500-999</b>	9	9	9	9
<b>1000-1499</b>	12	8	13	9
<b>1500-1999</b>	5	4	5	6
<b>2000-2999</b>	11	12	13	11
<b>3000-3999</b>	11	10	12	9
<b>4000-4999</b>	8	3	8	6
<b>5000-5999</b>	10	5	7	4
<b>6000-7999</b>	4	5	7	5
<b>8000-9999</b>	4	0	3	2
<b>10000-11999</b>	3	1	2	2
<b>12000 and more</b>	4	3	3	3
<b>Mean</b>	3100.6	2357.0	3038.8	2010.3
<b>N</b>	259	264	773	774

**Table 3**

**Primary Riding Purpose, Habits, Practices and Sites**

Characteristic	Untrained		Beginner Trained		Odds Ratio	
	1998	1999	1998	1999	1998	1999
<b>Primary Riding Purpose <sup>1</sup></b>						
Recreation	82	88	88	92	1.07	1.05
Work	15	13	8	12	0.53	0.92
School	2	1	2	2	1.00	
Other	15	8	8	7	0.53	0.88
<b>Primary Riding Habits <sup>1</sup></b>						
Ride alone	67	72	52	59	0.78	0.82
Ride with other	24	19	30	34	1.25	1.79
Ride with group	13	11	17	15	1.31	1.36
Carry a passenger	11	10	5	6	0.45	0.60
Ride as a passenger	1	10	4	6	-	0.60
<b>Riding Practices</b>						
On-road	96	95	97	97	1.01	1.02
Off-road	4	3	2	2	-	-
Both	0	2	1	1	-	-
Total	100	100	100	100		
<b>Riding Sites</b>						
City	14	9	10	7	0.71	0.78
Suburbs	46	51	42	47	0.91	0.92
Country	35	35	34	37	0.97	1.06
Other	5	5	14	9	2.80	1.80
Total	100	100	100	100		

<sup>1</sup>Percentages are based on multiple responses.

**Table 4**

**Self-Reported Accidents**

Characteristic	1998		<i>p</i>	1999		<i>p</i>
	<u>Untrained</u> N=13	<u>Beginner Trained</u> N=51		<u>Untrained</u> N=12	<u>Beginner Trained</u> N=55	
	%	%		%	%	
<b>Prior Miles</b>						
<b>0-499</b>	38	61	0.148	42	67	.097
<b>500 +</b>	62	39		58	33	
<b>Past Year Miles</b>						
<b>0-499</b>	15	4	0.127	8	11	.792
<b>500 +</b>	85	96		92	89	
<b>Rate</b>						
<b>Accidents/VMT*</b>	2.41	2.63		2.26	3.01	
<b>Accidents/Owned     Vehicle**</b>	7.98	8.54		6.42	8.84	

\*100,000 miles

\*\*100 vehicles

**Table 5**  
**Logistic Model I to Predict Self-Reported**  
**Accidents**

<b>Predictors</b>	<b>B</b>	<b>SE</b>	<b>p</b>	<b>Odds</b>	<b>CI</b>
<i>1998 Cohort</i>					
<b>Age</b>					
Less than 21	1.233	.386	.001	3.432	1.610, 7.315
21-29	.082	.317	.795	1.086	.583, 2.022
<b>Past Year Miles</b>					
0-499	-1.230	.473	.009	.292	.116, .793
<b>Training Status</b>					
Untrained	-.027	.298	.929	.974	.543, 1.747
<i>1999 Cohort</i>					
	<b>B</b>	<b>SE</b>	<b>p</b>	<b>Odds</b>	<b>CI</b>
<b>Age</b>					
Less than 21	.850	.565	.132	2.341	.774, 7.078
21-29	.797	.288	.006	2.218	1.263, 3.897
<b>Past Year Miles</b>					
0-499	-1.498	.476	.002	.224	.088, .568
<b>Training Status</b>					
Untrained	-.480	.359	.182	.619	.306, 1.252



**Table 6**

**Logistic Model II to Predict Self-Reported  
Accidents**

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<b>Predictors</b>	<b>B</b>	<b>SE</b>	<b>p</b>	<b>Odds</b>	<b>CI</b>
<b>1999 Cohort</b>					
<b>Age</b>					
Less than 21	<b>.839</b>	<b>.570</b>	<b>.141</b>	<b>2.315</b>	<b>.757, 7.081</b>
21-29	<b>.665</b>	<b>.295</b>	<b>.024</b>	<b>1.945</b>	<b>1.090, 3.471</b>
<b>Past Year Miles</b>					
0-499	<b>-1.061</b>	<b>.485</b>	<b>.029</b>	<b>.346</b>	<b>.134, .895</b>
<b>Risky Behavior</b>	<b>.250</b>	<b>.102</b>	<b>.015</b>	<b>1.283</b>	<b>1.050,1.568</b>

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Table 7

SHA Reported Accidents

Characteristic	<u>Untrained</u>	<u>1998</u>		<u>1999</u>	
		<u>Untrained</u>	<u>Beginner Trained</u>	<u>Untrained</u>	<u>Beginner Trained</u>
	N=5	N=19	N=4	N=11	
	%	%	%	%	
<b>Prior Miles</b>					
0-499	20	53	0.193	25	73
500 +	80	47		75	27
<b>Past Year Mile</b>					
0-499	0	11	0.449	25	20
500 +	100	89		75	80
<b>Rate</b>					
Accidents/VMT*	0.76	0.83		.75	.60
Accidents/Owned Vehicle**	2.52	2.71		2.14	1.77

\*100,000 miles

\*\*100 vehicles

**Table 8**  
**MVA Moving Citations**  
**Follow-up I**

Citations	1998		1999	
	Untrained	Beginner Trained	Untrained	Beginner Trained
<b>Total Moving Citations</b>	<b>14</b>	<b>14</b>	<b>17</b>	<b>10</b>
<b>Number of Citations (%)</b>				
<b>0</b>	<b>86</b>	<b>86</b>	<b>84</b>	<b>90</b>
<b>1</b>	<b>10</b>	<b>10</b>	<b>13</b>	<b>8</b>
<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>4</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Mean Citations<sup>1</sup></b>	<b>0.14</b>	<b>0.14</b>	<b>0.20</b>	<b>0.11</b>

<sup>1</sup>  $p > 0.05$

**Table 9**

**MVA Moving Citations  
1998 Cohort Follow-up II**

	<b>Untrained</b>	<b>Beginner Trained</b>
<b>Total Moving Citations</b>	<b>19</b>	<b>15</b>
<b>Number of Citations (%)</b>		
<b>0</b>	<b>85.4</b>	<b>87.6</b>
<b>1</b>	<b>12.0</b>	<b>10.0</b>
<b>2</b>	<b>2.0</b>	<b>2.0</b>
<b>3</b>	<b>0.3</b>	<b>0.4</b>
<b>4</b>	<b>0.3</b>	<b>0</b>
<b>Mean Citations</b>	<b>0.19</b>	<b>0.15</b>

**Table 10****Use of Safety Equipment  
Follow-up I**

<b>Characteristic</b>	<b><u>Untrained</u></b>		<b><u>Beginner Trained</u></b>		<b><u>Odds Ratio</u></b>	
	<b>1998</b>	<b>1999</b>	<b>1998</b>	<b>1999</b>	<b>1998</b>	<b>1999</b>
	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>		
<b>Full Helmet</b>	<b>76</b>	<b>71</b>	<b>75</b>	<b>70</b>	<b>0.99</b>	<b>1.00</b>
<b>Partial Helmet</b>	<b>24</b>	<b>29</b>	<b>25</b>	<b>30</b>	<b>1.04</b>	<b>1.03</b>
<b>Long Pants</b>	<b>91</b>	<b>94</b>	<b>96</b>	<b>97</b>	<b>1.05</b>	<b>1.03</b>
<b>Boots</b>	<b>62</b>	<b>70</b>	<b>82</b>	<b>86</b>	<b>1.32</b>	<b>1.23</b>
<b>Gloves</b>	<b>57</b>	<b>60</b>	<b>76</b>	<b>74</b>	<b>1.33</b>	<b>1.23</b>
<b>Jacket</b>	<b>52</b>	<b>66</b>	<b>66</b>	<b>62</b>	<b>1.27</b>	<b>0.94</b>
<b>Bright Colored Clothing</b>	<b>30</b>	<b>40</b>	<b>41</b>	<b>52</b>	<b>1.37</b>	<b>1.30</b>
<b>Eye Shield</b>	<b>82</b>	<b>93</b>	<b>95</b>	<b>97</b>	<b>1.16</b>	<b>1.04</b>
<b>Mean Score<sup>1</sup></b>	<b>14.5</b>	<b>15.6</b>	<b>16.7</b>	<b>16.9</b>		
<b>N</b>	<b>341</b>	<b>256</b>	<b>970</b>	<b>794</b>		

<sup>1</sup>p<.001

**Table 11****Use of Safety Equipment  
1998 Cohort Follow-up II**

Characteristic	Untrained %	Beginner Trained %	Odds Ratio
Full Helmet	67	68	1.00
Partial Helmet	33	32	1.00
Long Pants	95	98	1.03
Boots	68	87	1.28
Gloves	57	80	1.40
Jacket	63	78	1.24
Bright Colored Clothing	28	44	1.57
Eye Shield	91	97	1.07
Mean Score <sup>1</sup>	15.22	16.97	
N	115	340	

<sup>1</sup>p<.001

**Table 12**  
**Risky Behaviors**  
**Follow-up I**

Characteristic	<u>Untrained</u>		<u>Beginner</u> <u>Trained</u>		<u>Odds Ratio</u>	
	1998	1999	1998	1999	1998	1999
	%	%	%	%		
Exceeding Speed Limit	79	72	74	71	0.94	0.99
Following Too Closely	20	21	22	22	1.10	1.05
Passing Vehicles Improperly	17	22	14	11	0.82	0.50
Running Lights/Stop Signs	3	5	4	4	-	-
Mean Score <sup>1</sup>	1.44	1.37	1.39	1.25		

<sup>1</sup>p>0.05

**Table 13**  
**Risky Behaviors**  
**1998 Cohort Follow-up II**

Characteristic	Untrained %	Beginner Trained %	Odds Ratio
Exceeding Speed Limit	86	82	0.95
Following Too Closely	34	27	0.79
Passing Vehicles Improperly	16	13	0.81
Running Lights/Stop Signs	5	4	
Mean Score <sup>1</sup>	1.66	1.48	
N			
	115	340	

<sup>1</sup>p>0.05



**Table 14**

**Law Breaking Behaviors  
Follow-up I**

Characteristic	1998			1999		
	Untrained	Beginner Trained	p	Untrained	Beginner Trained	p
a. Uninsured	4%	2%	.123	4%	1%	.030
N	235	737		185	611	
b. Drinking	21%	13%	.001	9%	10%	.901
N	271	839		271	839	
c. Not Holding Class M License	4%	3%	.449	5%	4%	.174
N	338	968		279	821	

**Table 15**

**Law Breaking Behaviors  
1998 Cohort Follow-up II**

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<b>Characteristic</b>	<b><u>Untrained</u></b>	<b><u>Beginner Trained</u></b>	<b><i>p</i></b>
	<b>%</b>	<b>%</b>	
<b>Uninsured</b>	<b>2</b>	<b>1</b>	<b>0.227</b>
<b>N</b>	<b>105</b>	<b>295</b>	
<b>Drinking</b>	<b>14</b>	<b>14</b>	<b>0.928</b>
<b>N</b>	<b>111</b>	<b>327</b>	

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**Table 16**

**Rider Assessment of MRC**

<b>Characteristic</b>	<b><u>Beginner Trained</u></b> <b>1998</b>		<b><u>Beginner Trained</u></b> <b>1999</b>	
	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>
<b>Course was helpful to safe riding</b>	<b>99</b>	<b>913</b>	<b>99</b>	<b>869</b>
<b>Skills Improved after taking the course</b>	<b>97</b>	<b>912</b>	<b>98</b>	<b>869</b>
<b>Suggested for improvement</b>	<b>27</b>	<b>899</b>	<b>25</b>	<b>863</b>
<b>MRC Ratings</b>	$\bar{X}$		$\bar{X}$	
<b>Riding Section</b>	<b>4.74</b>	<b>957</b>	<b>4.63</b>	<b>869</b>
<b>Classroom Section</b>	<b>4.46</b>	<b>958</b>	<b>4.31</b>	<b>869</b>

**For 1998: t (1044) = 12.00, p<0.001**

**For 1999: t (868) = 12.346, p<0.001**

**Table 17**

**Percentage Reporting MRC Helpful**

<b>Characteristic</b>	<b>Beginner Trained</b>	
	<b>1998</b>	<b>1999</b>
	<b>%</b>	<b>%</b>
<b>Turning</b>	<b>99</b>	<b>99</b>
<b>Shifting</b>	<b>96</b>	<b>96</b>
<b>Stopping</b>	<b>99</b>	<b>99</b>
<b>Swerving/Oacle Avoidance</b>	<b>99</b>	<b>98</b>
<b>Quick Stops</b>	<b>99</b>	<b>99</b>
<b>Scanning/Looking</b>	<b>99</b>	<b>99</b>
<b>Identifying Hazards</b>	<b>97</b>	<b>98</b>
<b>Predicting Hazards</b>	<b>98</b>	<b>97</b>
<b>Avoiding Hazards</b>	<b>98</b>	<b>98</b>
<b>Reaction to Surprise Hazards</b>	<b>94</b>	<b>95</b>
<b>N</b>	<b>953</b>	<b>870</b>

# Appendix A Baseline Questionnaire



## Motorcycle Safety Questionnaire

The Motor Vehicle Administration is conducting a research project on its motorcycle safety effort and would appreciate your assistance. This questionnaire is one element of the project. Please answer each question. The information you provide will be **CONFIDENTIAL** and **WILL NOT** affect your drivers license record in any way.

Driver License Number \_\_\_\_\_

1. Your age: \_\_\_\_\_ 2. Your gender: M \_\_\_\_\_ F \_\_\_\_\_

3. Do you have any type of driver's license? Yes \_\_\_\_\_ No \_\_\_\_\_

4. Please check each type of vehicle license you have held and indicate for how long:

\_\_\_\_\_ Private \_\_\_\_\_ yrs \_\_\_\_\_ mths \_\_\_\_\_ Commercial \_\_\_\_\_ yrs \_\_\_\_\_ mths \_\_\_\_\_ Motorcycle \_\_\_\_\_ yrs \_\_\_\_\_ mths

5. How long have you operated a motorcycle? \_\_\_\_\_ years and/or \_\_\_\_\_ months

6. Of the time you spend riding a motorcycle, what percentage is spent...? Off-road (dirt) \_\_\_\_\_ % On-road \_\_\_\_\_ %

7. Each month, how many hours do you spend riding...? Off-road \_\_\_\_\_ hours On-road \_\_\_\_\_ hours

8. Average miles per year riding: \_\_\_\_\_ miles

9. Of the time you spend riding a motorcycle, what percentage is spent in the...?

City \_\_\_\_\_ % Suburbia \_\_\_\_\_ % Country \_\_\_\_\_ %

10. As an operator of a motorcycle, in how many accidents have you been involved? \_\_\_\_\_

11. How many of these motorcycle accidents required medical attention? \_\_\_\_\_

12. As an operator of a car or truck, in how many accidents have you been involved? \_\_\_\_\_

13. How many of these car or truck accidents required medical attention? \_\_\_\_\_

14. Please estimate your risk of being in a motorcycle accident within the next 12 months as compared to others who have as much experience riding as you. (please circle a number)

Never happen    1    2    3    4    5    6    7    8    9    Certain to happen

15. Do you currently own a motorcycle? Yes \_\_\_\_\_ No \_\_\_\_\_ make/model \_\_\_\_\_

16. Do you plan to buy a motorcycle in the next 6 months? Yes \_\_\_\_\_ No \_\_\_\_\_ make/model \_\_\_\_\_

17. Approximately, how many miles do you expect to ride in the next 12 months? \_\_\_\_\_ miles

18. In the next 12 months, of the time you spend riding, what percentage will be...? Off-road (dirt) \_\_\_\_\_ % On-road \_\_\_\_\_ %

19. In the next 12 months, of the time you spend riding, what percentage will be spent in the...?

City \_\_\_\_\_ % Suburbia \_\_\_\_\_ % Country \_\_\_\_\_ %

20. Answer if applicable to you:

\_\_\_\_\_ I have taken the Motorcycle Safety course: Date \_\_\_\_\_ Location \_\_\_\_\_

\_\_\_\_\_ I am taking the Motorcycle Safety course: Date \_\_\_\_\_ Location \_\_\_\_\_

\_\_\_\_\_ I am planning to take the Motorcycle Safety course: Date \_\_\_\_\_ Location \_\_\_\_\_

\_\_\_\_\_ I have not taken and will not take the Motorcycle Safety course: Licensing exam location \_\_\_\_\_

As a follow up to this survey, are you willing to complete a similar survey once a year for two years? yes \_\_\_\_\_ no \_\_\_\_\_  
Please print your name and phone number so we may contact you if necessary.

Name \_\_\_\_\_ Telephone No. \_\_\_\_\_ Date \_\_\_\_\_

## Appendix B First Follow-up Questionnaire

Dear Motorcyclist:

In 1998, you obtained your Maryland Class M motorcycle license. The Maryland Motor Vehicle Administration is conducting a survey to better understand your motorcycle riding patterns and practices in the year after you received your license. Your assistance is very much appreciated. Please answer all the questions and return your completed survey in the enclosed stamped envelope within the next two weeks. Please note that all your answers will be strictly confidential and will be used for only research purposes. Your answers will not affect your licensing or driving record and will in no way be associated with you personally.

### QUESTIONS

1. In 1998 you obtained your Maryland Class M motorcycle license. Before that time, had you ever operated a motorcycle? (Circle the one that applies to you). →

If no, skip to question 4.

2. If yes, approximately how many miles per year did you ride before obtaining your Class M license? →
3. For how many TOTAL years have you operated a motorcycle? →
4. Approximately how many miles did you ride a motorcycle in the year after you received your license? →

If zero, skip to question 6.

### ANSWERS

YES      NO

\_\_\_\_\_ miles per year

\_\_\_\_\_ years

\_\_\_\_\_ miles

For the next group of questions (5A-5C), please answer with one of the following responses:

- ALWAYS - 1
- MOST OF THE TIME - 2
- SOME OF THE TIME - 3
- NEVER - 4

	Always	Most Of the Time	Some of the Time	Never
5A. When riding your motorcycle in the past year, how often have you worn:				
1. a full helmet (head & ears covered) →	1	2	3	4
2. a partial helmet (ears not covered) →	1	2	3	4
3. long pants →	1	2	3	4
4. gloves →	1	2	3	4
5. boots →	1	2	3	4
6. a jacket →	1	2	3	4
7. bright colored clothing →	1	2	3	4
8. an eye shield (other than glasses) →	1	2	3	4
5B. How often do you ride:				
1. with 2 or more other motorcyclists →	1	2	3	4
2. with one other motorcyclist →	1	2	3	4
3. by yourself →	1	2	3	4
4. carrying a passenger →	1	2	3	4
5. as a passenger →	1	2	3	4
5C. How often do you ride for:				
1. transportation to and from work →	1	2	3	4
2. transportation to and from school →	1	2	3	4
3. recreation →	1	2	3	4
4. other purposes →	1	2	3	4
5D. Choose only one answer. Do you ride primarily:				
on-road - 1   OR		on-road	off-road	
off-road - 2?		1	2	
5E. Choose only one answer. Do you ride primarily in the:				
city - 1   OR	city	suburbs	country	
suburbs - 2   OR	1	2	3	
country - 3?				

6. Do you own a motorcycle? →  
(If no, skip to question 7)

YES NO

If yes:

a. What is the make and model? →

b. What is the engine size (cc's)? →

c. Is this motorcycle insured? →

d. From the list provided, circle the main reason (one answer only) for choosing or buying this motorcycle. →

YES NO

1. Price
2. Appearance
3. Speed/Power
4. Performance
5. Reputation of Company
6. Other reason

7. Do you plan to buy a motorcycle within the next year? →

YES NO

(If no, skip to question 8)

If yes:

a. What make and model do you think you will purchase? →

b. What engine size (cc's) does this motorcycle have? →

c. From the list provided, circle the ONE answer which best describes what will most contribute to your purchasing decision? →

Make \_\_\_\_\_

Model \_\_\_\_\_

\_\_\_\_\_ cc's

1. Price
2. Appearance
3. Speed/Power
4. Performance
5. Reputation of Company
6. Other reason

8. Do you currently have a Maryland Class M, motorcycle license? →

YES NO

If yes, how long ago did you get your motorcycle license? →

\_\_\_\_\_ yrs \_\_\_\_\_ mths

9. Do you have any other class of vehicle license? →  
If yes, what type of license do you have? →

YES NO

How long have you held this class license? →

\_\_\_\_\_ yrs \_\_\_\_\_ mths



10. Have you ever taken the Maryland Motorcycle Training Safety Course? →  
 (If no, skip to question 13.)

YES (NC

If yes: at which branch in Maryland, did you take the course? →

\_\_\_\_\_ branch

a. Have you taken the Beginner Course, how many times have you taken it and at what branch? →

YES NO \_\_\_\_\_ times  
 \_\_\_\_\_ branch

b. Have you taken the Advanced Course, how many times have you taken it and at what branch? →

YES NO \_\_\_\_\_ times  
 \_\_\_\_\_ branch

c. Do you believe that the course was helpful to your safety riding? →

YES NO

d. Do you believe that your skills improved after taking the rider course? →

YES NO

e. Do you have any suggestions to improve the existing training curriculum? →

YES NO

If yes, please explain.

11. Please rate the following items (11a-11b) on a scale of 1 to 5.

a. How helpful do you feel the riding section of the course was to you? →

1	2	3	4	5
Extremely Helpful				Not at all Helpful

b. How helpful do you feel the classroom section of the course was to you? →

1	2	3	4	5
Extremely Helpful				Not at all Helpful

12. Were the following skills presented to you in the course in a way that was clear and helpful?

- a. Turning →
- b. Shifting →
- c. Stopping →
- d. Swerving/obstacle avoidance →
- e. Quick stops →
- f. Scanning/looking →
- g. Identifying hazards →
- h. Predicting hazards →
- i. Avoiding hazards →
- j. Reaction to surprise hazards →

YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO

13. Have you taken any other motorcycle training safety course outside of the Maryland Motorcycle Training Safety Course? (Please include out of state courses as well.) →

If yes, please indicate the exact location. →

YES NO

14. As the operator of a motorcycle, were you involved in any motorcycle accidents in the past year? →

If yes, please go to the sheet provided on page 6, and answer all the questions for each accident you have indicated.

YES NO

15. As the operator of a car or truck, were you involved in any car or truck accidents in the past year? →

If yes, please go to the sheet provided on page 7, and answer all the questions for each accident you have indicated.

YES NO

16. For the next items (16a - 16d), please use the following scale:

- ALWAYS - 1
- MOST OF THE TIME - 2
- SOME OF THE TIME - 3
- NEVER - 4

While riding your motorcycle, how often do you find yourself:

- a. exceeding the speed limit? →
- b. following too closely? →
- c. passing other vehicles improperly? →
- d. running lights or stop signs? →

Always	Most Of the Time	Some of the Time	Never
1	2	3	4
1	2	3	4
1	2	3	4
1	2	3	4

17. Have you ever operated a motorcycle under the influence of medication? →

If yes, what kind of medication? →

YES NO

18. Have you ever had a drink before operating your motorcycle? →

If yes, how often do you drink and ride? →

YES NO

- 1. Always
- 2. Most of the time
- 3. Some of the time
- 4. Never

Indicate the total number of motorcycle accidents you have been involved in (as the operator of a motorcycle) in the past year.

Please answer the following questions for each accident indicated above.

1. What type of motorcycle were you operating? →
2. Did you require medical attention? →
3. Did anyone else require medical attention? →
4. If yes, how much did this accident cost in medical expenses? →
5. Was any damage done to your motorcycle? →
6. If yes, how much did this damage to your motorcycle cost? →
7. Was any damage done to another vehicle or object? →
8. Was this accident reported to the police? →
9. Was this accident your fault? →
10. Did you miss any days from work because of this accident? →
11. If yes, how much money did these missed days cost you? →
12. From the list provided, please tell us which category this accident falls into →

Number of accidents		Accident #1		Accident #2	
make	_____	make	_____	model	_____
model	_____	YES	NO	YES	NO
		YES	NO	YES	NO
	\$ _____			\$ _____	
		YES	NO	YES	NO
	\$ _____			\$ _____	
		YES	NO	YES	NO
		YES	NO	YES	NO
		YES	NO	YES	NO
	\$ _____			\$ _____	
		1. Low speed fall		1. Low speed fall	
		2. High speed fall		2. High speed fall	
		3. Sliding on gravel or wet pavement		3. Sliding on gravel or wet pavement	
		4. Collision with another vehicle		4. Collision with another vehicle	
		5. Collision with a stationary object		5. Collision with a stationary object	
		6. Other _____		6. Other _____	

Indicate the total number of car accidents you have been involved in (as the operator of a car or truck) in the past year.

Please answer the following questions for each accident indicated above.

1. Did you require medical attention? →
2. Did anyone else require medical attention? →
3. Was any damage done to your car or truck? →
4. Was any damage done to another vehicle or object? →
5. Was this accident reported to the police? →
6. Was this accident your fault? →

1. Did you require medical attention? →
2. Did anyone else require medical attention? →
3. Was any damage done to your car or truck? →
4. Was any damage done to another vehicle or object? →
5. Was this accident reported to the police? →
6. Was the accident your fault? →

Number of accidents

Accident #1

Accident #2

	YES	NO		YES	NO
1. Did you require medical attention? →	YES	NO	2. Did anyone else require medical attention? →	YES	NO
2. Did anyone else require medical attention? →	YES	NO	3. Was any damage done to your car or truck? →	YES	NO
3. Was any damage done to your car or truck? →	YES	NO	4. Was any damage done to another vehicle or object? →	YES	NO
4. Was any damage done to another vehicle or object? →	YES	NO	5. Was this accident reported to the police? →	YES	NO
5. Was this accident reported to the police? →	YES	NO	6. Was this accident your fault? →	YES	NO
6. Was this accident your fault? →	YES	NO			

Accident #3

Accident #4

	YES	NO		YES	NO
1. Did you require medical attention? →	YES	NO	2. Did anyone else require medical attention? →	YES	NO
2. Did anyone else require medical attention? →	YES	NO	3. Was any damage done to your car or truck? →	YES	NO
3. Was any damage done to your car or truck? →	YES	NO	4. Was any damage done to another vehicle or object? →	YES	NO
4. Was any damage done to another vehicle or object? →	YES	NO	5. Was this accident reported to the police? →	YES	NO
5. Was this accident reported to the police? →	YES	NO	6. Was the accident your fault? →	YES	NO
6. Was the accident your fault? →	YES	NO			

**Appendix C**  
**Second Follow-up Questionnaire**  
*Maryland Motorcycle Safety Study Questionnaire*

**Second Follow-Up (2000)**

Dear Motorcyclist:

We would like to thank you for providing the valuable information on our Baseline and First follow-up survey of motorcycle safety study. The information was very helpful in understanding the problems related with motorcycle riding and the impact of the Maryland Motorcycle Training Course. Last year around this time, you filled out or answered over the telephone the first follow up questionnaire of motorcycle safety study. As a second follow up to that survey, the Maryland Vehicle Administration is conducting another survey to better understand your motorcycle riding patterns and practices. Your assistance is very much appreciated. Please answer all the questions and return your completed survey in the enclosed stamped envelope. Please note that all your answers will be strictly confidential and will be used for research purposes only. Your answers will not affect your licensing or driving record and will in no way be associated with you personally.

**QUESTIONS**

**For the following questions (1A-1C), please answer with one of the responses provided below:**

- ALWAYS – 3**  
**MOST OF THE TIME – 2**  
**SOME OF THE TIME – 1**  
**NEVER – 0**

1A. When riding your motorcycle in the past year, how often have you worn:

	Always	Most Of the Time	Some of the Time	Never
1. a full helmet →	3	2	1	0
2. a partial helmet →	3	2	1	0
3. long pants →	3	2	1	0
4. gloves →	3	2	1	0
5. boots →	3	2	1	0
6. a jacket →	3	2	1	0
7. bright colored clothing	3	2	1	0
8. an eye shield →	3	2	1	0

1B. In the past year, of the time you ride, how often do you ride:

- 1. by yourself →
- 2. with one other motorcyclist →
- 3. with a group of other motorcyclists →
- 4. carrying a passenger →
- 5. as a passenger →

3	2	1	0
3	2	1	0
3	2	1	0
3	2	1	0
3	2	1	0

1C. In the past year, of the time you ride, how often do you ride for:

- 1. recreation →
- 2. transportation to and from work →
- 3. transportation to and from school →
- 4. other purposes →

3	2	1	0
3	2	1	0
3	2	1	0
3	2	1	0

1D. Choose only ONE answer. Do you ride primarily:  
 on-road - 1 OR  
 off-road - 2?

on-road	off-road
1	2

1E. Choose only ONE answer. Do you ride primarily in the:

- city - 1
- suburbs - 2 OR
- country - 3?

city	suburbs	country
1	2	3

2. Do you own a motorcycle? → YES NO  
 If no, skip to next question.

If yes:

- a. What is the make and model? →
- b. What is the engine size (cc's)? →
- c. Is this motorcycle insured? →
- d. From the list provided, circle the main reason (one answer only) for choosing or buying this motorcycle. →

---

cc's

---

(YES) NO

- 1. Price
- 2. Appearance
- 3. Speed/Power
- 4. Performance
- 5. Reputation of Company
- 6. Other reason

---

3. Do you plan to buy a motorcycle within the next year? →

YES NO

If no, skip to next question.

If yes:

- a. What make and model do you think you will purchase? →
- b. What engine size (cc's) does this motorcycle have? →
- c. From the list provided, circle the **one** answer which best describes what will most contribute to your purchasing decision? →

Model \_\_\_\_\_  
\_\_\_\_\_ cc's

- 1. Price
- 2. Appearance
- 3. Speed/Power
- 4. Performance
- 5. Reputation of Company
- 6. Other reason

4. As the operator of a motorcycle, were you involved in any motorcycle accidents in the past year? →

YES NO

If no, skip to next question.

If yes, please go to the sheet provided on page 4, and answer all the questions for each accident you have indicated.

5. As the operator of a car or truck, were you involved in any car or truck accidents in the past year? →

YES NO

If no, skip to next question.

If yes, please go to the sheet provided on page 6, and answer all the questions for each accident you have indicated.

6. For the next items (6a - 6d), please use the following scale:

- ALWAYS - 3
- MOST OF THE TIME - 2
- SOME OF THE TIME - 1
- NEVER - 0

In the past year, while riding your motorcycle, how often do you find yourself:

- a. exceeding the speed limit? →
- b. following too closely? →
- c. passing other vehicles improperly? →
- d. running lights or stop signs →

Always	Most Of the Time	Some of the Time	Never
3	2	1	0
3	2	1	0
3	2	1	0
3	2	1	0

7. In the past year, have you ever operated a motorcycle under the influence of medication? →

If yes, what kind of medication? →

8. In the past year, have you ever had a drink or two or more before operating your motorcycle? →

If yes, how often do you drink and ride? →

YES

NO

YES

3. Always

2. Most of the time

1. Some of the time

0. Never



### Motorcycle Accidents

Indicate the total number of motorcycle accidents you have been involved in (as the operator of a motorcycle) in the past year.

Please answer the following questions for each accident indicated above.

1. What type of motorcycle were you operating? →
2. Did you require medical attention? →
3. Did anyone else require medical attention? →
4. If yes, how much did this accident cost in medical expenses? →
5. Was any damage done to your motorcycle? →
6. If yes, how much did this damage to your motorcycle cost? →
7. Was any damage done to another vehicle or object? →
8. Was this accident reported to the police? →
9. Was this accident your fault? →
10. Did you miss any days from work because of this accident? →
11. Did you wear a helmet while in the accident? →
12. Did you drink any alcohol before the accident? →
13. If yes, how much money did these missed days cost you? →
14. From the list provided, please tell us which category this accident falls into. →

Number of accidents			
Accident #1		Accident #2	
Date _____	Date _____		
make _____	make _____		
model _____	model _____		
YES	NO	YES	NO
YES	NO	YES	NO
\$ _____	\$ _____		
YES	NO	YES	NO
\$ _____	\$ _____		
YES	NO	YES	NO
YES	NO	YES	NO
YES	NO	YES	NO
YES	NO	YES	NO
YES	NO	YES	NO
YES	NO	YES	NO
YES	NO	YES	NO
\$ _____	\$ _____		
1. Low speed fall		1. Low speed fall	
2. High speed fall		2. High speed fall	
3. Sliding on gravel or wet pavement		3. Sliding on gravel or wet pavement	
4. Collision with another vehicle		4. Collision with another vehicle	
5. Collision with a stationary object		5. Collision with a stationary object	
6. Other _____		6. Other _____	

*Car/Truck Accidents*

Indicate the total number of car accidents you have been involved in (as the operator of a car or truck) in the past year.

Number of accidents

**Please answer the following questions for each accident indicated above.**

	Accident #1		Accident #2	
1. Did you require medical attention? →	YES	NO	YES	NO
2. Did anyone else require medical attention? →	YES	NO	YES	NO
3. Was any damage done to your car or truck? →	YES	NO	YES	NO
4. Was any damage done to another vehicle or object? →	YES	NO	YES	NO
5. Was this accident reported to the police? →	YES	NO	YES	NO
6. Was this accident your fault? →	YES	NO	YES	NO
	Accident #3		Accident #4	
1. Did you require medical attention? →	YES	NO	YES	NO
2. Did anyone else require medical attention? →	YES	NO	YES	NO
3. Was any damage done to your car or truck? →	YES	NO	YES	NO
4. Was any damage done to another vehicle or object? →	YES	NO	YES	NO
5. Was this accident reported to the police? →	YES	NO	YES	NO
6. Was the accident your fault? →	YES	NO	YES	NO

## Appendix D

### Number of Accidents Involving Motorcyclists in Maryland, 1994-2000

Accident Type	Year						
	1994	1995	1996	1997	1998	1999	2000
Fatal	29	27	24	26	34	44	51
Injury	889	800	695	690	744	770	897
Property Damage	165	162	170	182	188	256	214
Total Accident	1083	989	889	898	966	1070	1162

**Source: Maryland State Highway Administration**

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