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EVALUATION OF THE PRE-LICENCE TRAINING PROGRAM FOR MOTORCYCLISTS IN SOUTH AUSTRALIA

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TITLE: Evaluation of the pre-licence training program for motorcyclists in South Australia

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ABSTRACT:
A pre-licence training program for motorcyclists (Ridersafe) was introduced in South Australia on 13 April 1987 in an attempt to reduce the frequency of motorcycle crashes. Around this time, a system was set up to collect data to enable the effectiveness of the training program to be evaluated.

Examination of the data could not show any effect of Ridersafe on safety, either positive or negative. Further, the practical and scientific problems involved in collecting enough data to make a reasonable assessment of the effectiveness of Ridersafe would seem to preclude any conclusions from being drawn from available data in South Australia.

The literature review found that there is little that can confidently be said about the influence of motorcycle rider training programs on crashes, based on the studies reported to date. That training is capable of producing an increase in accidents has not been properly demonstrated by any study. From consideration of the very small number of studies that are of a good standard, training may either have no effect on accident rates or it may produce a decrease. This may be primarily through deterring individuals from becoming licensed.

KEY WORDS: education, evaluation, motorcycle, training

EXECUTIVE SUMMARY

A pre-licence training program for motorcyclists (Ridersafe) was introduced in South Australia on 13 April 1987 in an attempt to reduce the frequency of motorcycle crashes. Around this time, a system was set up by the Road Safety Division of the South Australian Department of Transport, the forerunner of the Office or Road Safety of the Department of Road Transport, to collect data to enable the effectiveness of the training program to be evaluated. This data was analysed and a preliminary internal report was completed in January 1991. The report found no evidence of any changes in the overall trends of motorcycle crashes over time which could be associated with Ridersafe, but it did find an *increase* in the frequency of crashes among a sample of Ridersafe riders compared to a sample of control riders who did not have any pre-licence training. This difference was large (4.4% for the Ridersafe group vs 1.8% for controls) and statistically significant, even after controlling for other confounding variables.

In 1993, the NHMRC Road Accident Research Unit was commissioned by the South Australian Department of Road Transport's Office of Road Safety to re-examine and verify this data and the conclusions drawn, to conduct a literature review of other work in the field and to produce a final report suitable for publication. This document is the result of that work.

The previous analysis of the data which indicated that Ridersafe had a negative effect on safety is shown to be misleading due to unusual characteristics of the major part of the control group. The re-examination of the data could not show any effect of Ridersafe on safety, either positive or negative. Further, the practical and scientific problems involved in collecting enough data to make a reasonable assessment of the effectiveness of Ridersafe would seem to preclude any conclusions from being drawn from available data in South Australia.

The literature review found that there is little that can confidently be said about the influence of motorcycle rider training programs on crashes, based on the studies reported to date. That training is capable of producing an increase in accidents has not been properly demonstrated by any study. From consideration of the very small number of studies that are of a good standard, training may either have no effect on accident rates or it may produce a decrease. This may be primarily through deterring individuals from becoming licensed.

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1. INTRODUCTION

A pre-licence training program for motorcyclists (Ridersafe) was introduced in South Australia on 13 April 1987 in an attempt to reduce the frequency of motorcycle crashes. Around this time, a system was set up by the Road Safety Division of the South Australian Department of Transport, the forerunner of the Office or Road Safety of the Department of Road Transport, to collect data to enable the effectiveness of the training program to be evaluated. This data consisted of trend data over a number of years before and after the introduction of Ridersafe and detailed information on two sample groups of riders; a Ridersafe group who had taken the Ridersafe course and a control group who had not. This data was analysed and a preliminary internal report was completed in January 1991.

The report found no evidence of any changes in the overall frequency trends of motorcycle crashes over time which could be associated with Ridersafe, but it did find an *increase* in crash frequency among the Ridersafe group compared to a control group of riders who did not have any pre-licence training. This difference was large (4.4% for the Ridersafe group vs 1.8% for controls) and statistically significant, even after controlling for other confounding variables.

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2. LITERATURE REVIEW

2.1 Scope of the Literature Review

Twenty studies that examined the influence of motorcycle rider training programs on accidents are considered in this review. All published studies, written in English and referenced in the following data bases, were included: Literature Analysis System On Road Safety (produced by the Library of the Department of Transport and Communications, Canberra); Transportation Research Information Service (US Department of Transportation and the Transportation Research Board, Washington). Also scanned was a published search of citations relating to motorcycle safety (National Technical Information Service, 1990). In addition, the library holdings of the Australian Road Research Board and the NHMRC Road Accident Research Unit were searched. Note that the focus is on training programs, so studies examining only the influence of skill tests have not been included.

A comprehensive review of the literature concerning motorcycle rider training and skill testing has been undertaken by McLaren (1994). In that review each study is described and assessed separately in considerable detail. It therefore seems unnecessary to repeat that form of presentation here. Instead, this review will give a critical overview of research into the effects of rider training programs.

2.2 Background

Since the 1960s, it has been widely appreciated that special efforts to improve the safety of motorcycle riders are warranted. This perception followed a resurgence in the popularity of motorcycling, with a corresponding increase in accidents involving motorcycles, and research providing evidence that, compared to car occupants, motorcyclists involved in crashes experienced higher risks (up to 15 times greater) of injury and death (Simpson & Mayhew, 1990).

Training programs for motorcycle riders were introduced, and continue to be conducted, in many western countries, in attempts to deal with the problem of a comparative lack of safety among motorcycle riders. Early support for such programs was derived from a review of motorcycle safety, commissioned by the (then) National Highway Safety Bureau of the United States Department of Transportation, in the mid-1960s. In the report of this review, it was asserted that a focus on rider training and licensing measures was likely to have the greatest long term benefit for motorcycle safety (McPherson, 1989).

With the proliferation of rider training programs, it might have been expected that a reasonable number would be subjected to rigorous evaluation. In fact, published evaluations of training programs are disappointingly few and most of the studies within this small body of literature suffer from methodological problems that bring into question the validity of their main results.

2.3 Description and Classification of the Literature

Of the 20 studies considered in this review, 12 are listed in Table 1 and summarised in more detail in Appendix A. These 12 studies all met a minimum standard with regard to study method, this being either that training was mandatory for novice riders, or that riders were assigned to training on a random basis, or in the case of a voluntary training program, that the study included an attempt to take into account differences between groups in exposure to risk of an accident (that is, differences in miles travelled, this criteria being adopted from McLaren, 1994). The remaining eight studies were not able to provide useful information towards this review due to inadequate study design or analysis. These eight studies and their limitations are set out in Table

2.

Table 1. Motorcycle Pre-Licence Training Studies

Study	Safety Effect	Quality
Jonah, Dawson & Bragg (1982)	none	good
Mortimer (1984)	none	problems
Mortimer (1988)	none	problems
Adams, Collingwood & Job (1985)	none	problems
Cooper & Rothe (1988)	none	good
New York State Department of Motor Vehicles (1988)	none	problems
Anderson, Ford & Peck (1980)	positive	good
Lakner (1984)	positive	problems
McDavid, Lohrmann & Lohrmann (1989)	positive	problems
Billheimer (1991)	positive	problems
Raymond & Tatum (1977)	negative	problems
Osga (1980)	negative	problems

Table 2. Studies Not Used in the Overview

Study	Comments
Satten (1980)	Small sample. No control for differences in exposure between trained group and comparison group.
Collins & Moore (1980)	No control group. Examined special population of m/c riders for whom training had been required by a court.
Leung & Rading (1987)	No control for differences in exposure between trained group and comparison group.
Shephard (1986)	Not rigorous. Trends in crashes loosely compared with the number of training programs in existence.
Wood & Bowen (1987)	Study competent but the design does not enable effects of training to be separated from effects of new testing procedures.
Wisher & Reid (1988)	No control group.
Namdaran & Elton (1988)	Small sample. No control for differences in exposure between trained group and comparison group.
Rockwell, Kiger & Carnot (1990)	Small sample. No control group. No exposure measures.

Table 1 (and Appendix A) groups the 12 studies according to their main result concerning the influence of a training program on accidents. Thus, six studies found no evidence of an effect of the training program on accidents, four indicated that the training program was associated with a reduction in accidents, and two showed that the training program was associated with an increase

in accidents. This depiction must be heavily qualified, however. The quality of each study was assessed and is indicated in the column labelled 'Quality' in Table 1 and Appendix A. The adequacy of the sample size, the study design and the analysis were taken into account in this assessment. A study method characterised by the word 'problems' indicates that the study was unsatisfactory in at least one methodological aspect so that little confidence can be placed in the interpretation of the results and the conclusion. A rating of 'good' indicates that the study was of a reasonable standard and the conclusion was appropriate to the results and likely to be sound. Of the 12 studies, only three achieved a rating of 'good'.

2.4 Discussion of the Literature

Many of the studies suffered from sample sizes that were too small for any systematic effects to have a reasonable chance of being detected amidst natural random variation in accident rates. To appreciate the sample sizes needed, consider that, typically, about 10 per cent of a group of novice riders will be involved in a casualty accident within the first year of riding. A training program might be expected to reduce the accident rate by 10 to 20 per cent. To detect a 10 per cent difference in the accident rate for a trained group with power of 80 per cent, using the conventional five per cent significance level, would require a comparison of two groups each containing around 13,500 motorcyclists (Cohen, 1988). To detect a difference of at least 20 percent in the accident rate (under the same conditions) would require approximately 3,200 motorcyclists in each group. The studies reviewed rarely had samples of this size which greatly compromised their ability to demonstrate small differences which would still be considered a valuable result of a training program.

A more serious problem, and one that affected almost all of the studies not listed as 'good', was a lack of comparability between those motorcyclists undertaking training and the control group. This was generally a consequence of the training being taken on a voluntary basis. To elaborate, riders who choose to take training voluntarily tend to be different from the general population of motorcycle riders in terms of age, sex, riding experience, road safety attitudes, risk taking, and possibly other factors as well. So riders completing voluntary training are likely to have a different accident experience from any control group drawn from the general population of riders as a result of pre-existing differences, independently of any influence of training. The picture may be further confused if individuals who elect to take training differ from the general population of motorcycle riders in their tendency to report accidents. Consequently, when a study finds that accident rates are different for a group of voluntarily trained riders and a control group, unless the analysis was sufficiently sophisticated, the cause of this difference remains unclear.

Three approaches are available to overcome this complicated problem of bias in non-randomised studies: matching, stratified analysis, and covariance or regression control (Fleiss, 1981). Basically, each method requires that detailed information on variables that are likely to differ between groups is collected and taken into account in the analysis. Jonah, Dawson and Bragg (1982) and Cooper and Rothe (1988) adopted covariance techniques to successfully deal with this problem, these studies being two of the three studies classified as 'good'. This difficulty was also handled well by Billheimer (1991) using careful matching, but the study is still in progress and the sample size achieved in the reports available to date (see also Wilson, Covitz and Hannigan, 1992) is not large enough for results to be interpreted soundly.

In only two studies were licence applicants randomly allocated to training or alternative conditions, that of Anderson, Ford and Peck (1980) and that of the New York State Department of Motor Vehicles (1988). From these studies it appears that the chief impact of training is to reduce the likelihood of an applicant completing the licensing procedure. In the first study (the remaining one of the 'good' trio) this effect then led to a reduced motorcycle accident rate for the group assigned to training as a whole. In the second study no differences in motorcycle accident rates between groups were found, but the conduct of this study has been subject to criticism (McPherson, 1989) and it is not clear what to make of the results. In both studies, further comparisons were made between groups of applicants who eventually achieved a licence under the various conditions. With regard to these analyses, it should be noted that the initial random allocation does not necessarily ensure that the final groups are similar in composition because the different licensing conditions had different rates of attrition. It is possible that those applicants who eventually gained a licence under the training condition - the regime which was the most demanding and had the greatest attrition rate - were more dedicated to motorcycle riding than those who obtained a licence under the alternative less-demanding conditions. This may mean, for example, that riders licensed under the training condition went on to do more riding, so had greater exposure to accident risk, than other licensed riders. The potential for such lack of comparability despite random allocation at baseline seems not to have been recognised by the authors of these studies and leaves some question marks over the results based only on those applicants gaining a licence.

Apart from problems with sample size and comparability of groups, one other deficiency was prominent in the studies reviewed, this being a design flaw that left several studies unable to provide information on serious accidents so that the accident rates presented are dubious. The problem lies in the sampling procedure and the method of obtaining accident data. For example, where a group of trained riders was identified some time after completion of the course and individual accident experience was sought by mail questionnaire, there is no way of knowing how many riders were killed or severely disabled in the period following training; these riders simply fall into the non-response category and the real pattern of accidents is obscured. Similarly, seeking a control group from, say, people entering a motorcycle dealership (as did

Mortimer, 1984) and obtaining retrospective information on accidents, guarantees that the controls will have survived any accidents they may have had. Thus, through such a sampling procedure it is not possible to count numbers of fatal accidents and unlikely to be possible to count numbers of disabling accidents. In like manner, several studies were (unwittingly) set up so that serious accidents were inevitably missed in the control group or the trained group or both.

A point worth making is that the studies reviewed examined accident experience over varying intervals of time, sometimes over just a short period following training but more often over quite a number of years. The question of how long any effects of training might be expected to be evident was rarely raised in the literature but is pertinent. Several studies seem to have opted for a long interval of exposure to compensate for a small sample size, but this has problems of its own. Logically, training effects should be most evident in a relatively short period of time following training, especially where novices are concerned. As riding experience accumulates, differences in accidents between trained and non-trained groups are likely to be diminished. Thus, well-constructed studies that examine accident occurrence over long periods of time would tend to decrease their chances of finding a difference between groups.

Note also that in many of the studies reviewed training was not taken by novices alone. It seems reasonable to assume that the effects of training (predominantly in riding skills) on accident rates would be strongest amongst novices, so the inclusion of experienced riders in analyses is likely to increase the difficulty of demonstrating an effect, especially when the sample size is not large.

2.5 Future Directions

More comprehensive evaluations of the effects of motorcycle rider training programs are needed, in addition to more carefully designed pieces of research, than those conducted to date. As suggested by Mayhew and Simpson (1989), evidence for an ameliorating influence of training on accidents may be lacking because the issue of effectiveness has not been addressed well enough. Attention has been restricted to overall accident rates but there may be important effects relating to the type and severity of accidents. In addition, whether or not training programs succeed in their intermediate objectives, such as improving rider skills, should be investigated.

One evaluation of skills acquired through a training course has been reported by Clayton and Sudlow (1987). While based on a small sample and not restricted to novice motorcycle riders, this research illustrates one of the elements of the broader approach required. Another demonstration is provided by a large study in progress in the UK to examine the relationship between learning experience and subsequent accident history for drivers of cars. The initial

report presents some interesting aspects of the research plan, including the intention to document progress in skills as well as ongoing monitoring of attitudes (Forsyth & Kompfner, 1991). Another project commenced recently in the UK is an evaluation of compulsory basic training for motorcyclists (Thompson, 1994). Results so far are concerned with the implementation of the program but the opportunity for extension to accident data is promising.

The content and emphasis of training programs should also be the subject of systematic inquiry. Recently, Chesham, Rutter and Quine (1991) found evidence for strong roles of attitudes and habits in unsafe motorcycle riding and advised that training programs should provide a sound cognitive and attitudinal platform for the behaviours taught. Further work is necessary in order to develop such programs, which is in line with the recommendation of Mayhew and Simpson (1989) for research to specify factors relevant to motorcycle accident avoidance and to examine how these are best imparted to novice riders.

2.6 Summary of Literature Review

In summary, there is little that can confidently be said about the influence of motorcycle rider training programs on accidents, based on the literature. That training is capable of producing an increase in accidents has not been properly demonstrated by any study. From consideration of the very small number of studies that are of a good standard, training may either have no effect on accident rates or it may produce a decrease. This may be primarily through deterring individuals from becoming licensed.

3. SA RIDERSAFE INTRODUCTION

The mechanisms for obtaining a motorcycle learner's permit and full licence both under the Ridersafe system and outside it are documented as follows. The phasing in of Ridersafe over the state of South Australia is also specified.

3.1 Gaining a Learner's Permit Before Ridersafe

To obtain a motorcycle licence before the introduction of Ridersafe the potential rider had to be at least 16 years old and had to sit a general theory test. On successful completion of this test, riders obtained a learner's permit enabling them to ride on the road with L-plates. The duration of the learner's permit was usually 3 months but could be longer for an additional fee.

The practical riding test could be taken anytime after the acquisition of a learner's permit. It consisted of a licence examiner (in city areas) or a police officer (country areas) following behind a motorcyclist in a 30 minute test of their riding ability. A pass on this test resulted in a probationary licence being granted. After one year of serious-violation-free riding this was converted to a full motorcycle licence.

It should be noted that prior to 1987 there was no specific motorcycle learner's permit. A general learner's permit allowed the holder to operate both a motorcycle and a car.

3.2 Gaining a Learner's Permit Under Ridersafe

Under the Ridersafe system, potential riders are required to be at least 16.5 years old and to complete the same general theory test as before the introduction of Ridersafe. However, before obtaining a learner's permit, they are required to attend two 4 hour training sessions at a training centre. These sessions involve instruction, videos and actual riding on motorcycles provided for them. If they are judged to be capable by the instructors, they are able to obtain a learner's permit and ride on the road with L-plates.

After a minimum of 4 months and a maximum of 6 months they are able to take a final 4 hour course where their performance is evaluated by the instructors. A successful pass at this stage enables them to obtain a probationary licence. After one year of serious-violation-free riding they are then eligible for a full licence provided that they are at least 19 years of age.

Prior to 1990, the age for applying for a learner's permit under Ridersafe was 16 years.

3.3 Ridersafe Coverage

The Ridersafe system for obtaining a motorcycle learner's permit was first introduced in the Adelaide metropolitan area on 13 April 1987. It was phased in over time by postcode, as shown in Table 3. If someone requested a motorcycle learner's permit and the postcode of their home address was in the region covered by Ridersafe at that time, they were given details of the Ridersafe program and told that they had to successfully complete the course before being granted a learner's permit.

There were some exceptions to this rule. Riders who had held a motorcycle learner's permit in the 12 months prior to the introduction of Ridersafe and were reapplying for another learner's permit were not required to take the Ridersafe course. There were also some rare exceptions where riders had taken a similar course in another state.

Currently, Port Lincoln, Bordertown, Kangaroo Island and the far west coast are still not covered due to very small numbers of applicants for motorcycle learner's permits from these areas. All current postcodes covered by Ridersafe are given in Appendix B.

Table 3. Ridersafe Introduction Schedule

Date	Postcode
1987 April 13	5022-5049
1987 May 19	5050-5062
1987 September 7	5000-5021 5063-5169 (but not SE of Blackwood/Belair)
1988 February 8	5501
1988 April 5	5170-5252 5350-5351 North to Williamstown South to Noarlunga Adelaide Hills
1988 May 17	5352-5709 5710(only Stirling North)
1988 August 29	5253-5349 Millicent
1988 June 27	Whyalla
1988 December	Murray Bridge
1989 January 23	Berri
Currently excluded	Port Lincoln Far west coast Kangaroo Island

4. THE SA RIDERSAFE COURSE

Detailed descriptions of the Ridersafe courses are given in Appendices C-E. A summary of the main components of the courses is given here.

4.1 Ridersafe Course Structure

The Ridersafe course consists of 2 levels. The first is a training course in the basics of motorcycle riding where a pass entitles the rider to obtain a learner's permit. The second is a

skills test where a pass entitles the rider to obtain a probationary motorcycle licence.

4.2 Ridersafe Level 1 Course

The level one course is split into two 4 hours sessions (Session A and Session B) held on separate days. These sessions are designed to take a person with no motorcycle riding experience at all and get them riding and also to instil some sense of safe riding in them.

Detailed time breakdowns for typical examples of the two sessions are given in Appendices C and D. In combination, the two sessions offer 190 minutes of lecture/discussion, 75 minutes of video and 184 minutes of hands on motorcycle riding.

Areas covered include: starting the motorcycle and using the controls; turning and braking; defensive riding; gear changing; braking in corners; and counter steering. These are all dealt with by discussion, video and on the riding range.

By the end of the second session, observed by one of the authors (CNK), even complete novices were riding comfortably. However, persons judged by the instructors not to be ready for open road riding were asked to return for a repeat course at no cost before being eligible to obtain a learner's permit.

4.3 Ridersafe Level 2 Course

The level two course is basically a practical test of the rider's ability on a series of tasks.

A detailed time breakdown of this course (Session C) is given in Appendix E. In summary, a typical course consists of 74 minutes of lecture/discussion, 38 minutes of video and 75 minutes of on-course riding.

After an introduction and review, the course observed was mainly a preparation for the final testing phase where riders had to complete a series of tasks to be eligible to obtain motorcycle P-plates.

The testing phase required the riders to complete the following tasks: ride around a sharp S-bend; do a tight U-turn; weave between closely spaced objects; and ride very slowly for 15 seconds, all without putting a foot onto the ground. Each time a foot was placed on the ground, a 10 point penalty was recorded with 21 points being a fail on the test.

The riders then had to successfully brake to a complete stop within 11 meters at 25km/hour after a hand signal from the instructors. This test had to be passed to become eligible for a P-plate.

Riders who fail either part of the test or are judged as being unsafe by the instructors are required to attend another level two course at no cost before proceeding to the motorcycle P-plate stage.

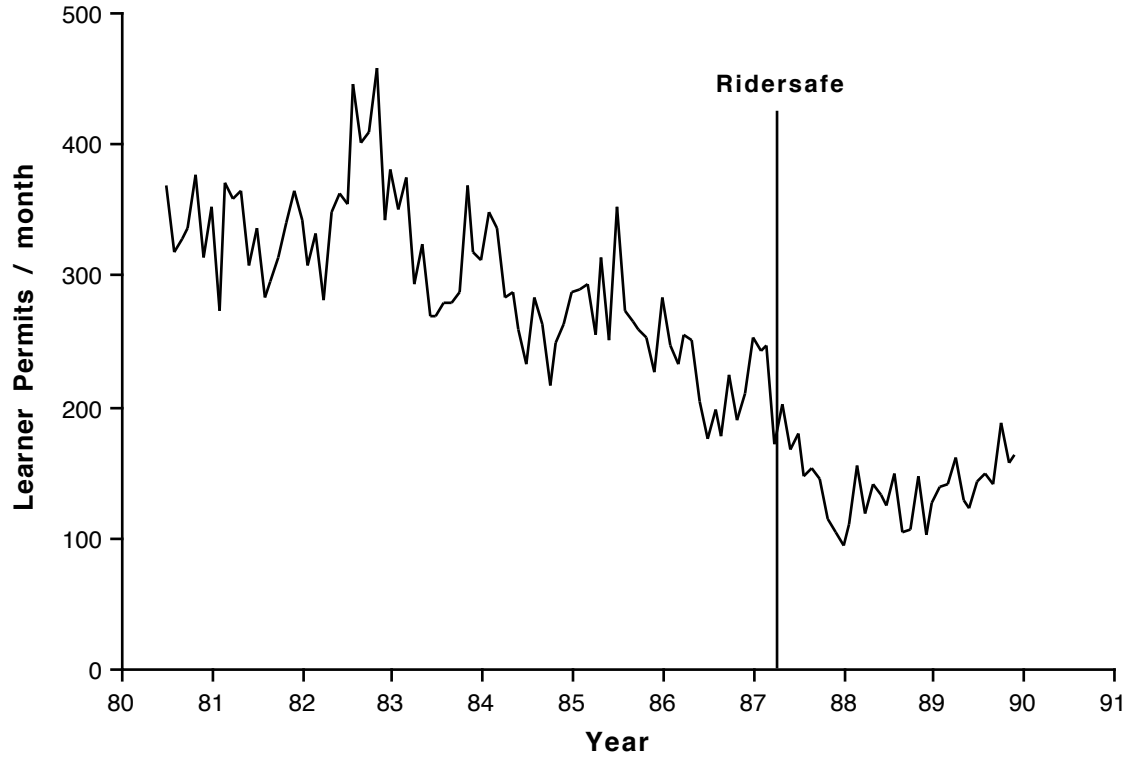
5. TREND DATA

Various measures of trend data over time were collected by the Office of Road Safety (and its predecessor) to aid in the evaluation of the Ridersafe program. These trends are presented here along with comments on their limitations.

5.1 Trends in Learner's Permits Issued

Data was collected on the number of motorcycle learner's permits issued per month in South Australia for the period 1981 to 1989. This trend data is presented in Figure 1.

Figure 1. Number of Motorcycle Learner's Permits Issued per Month

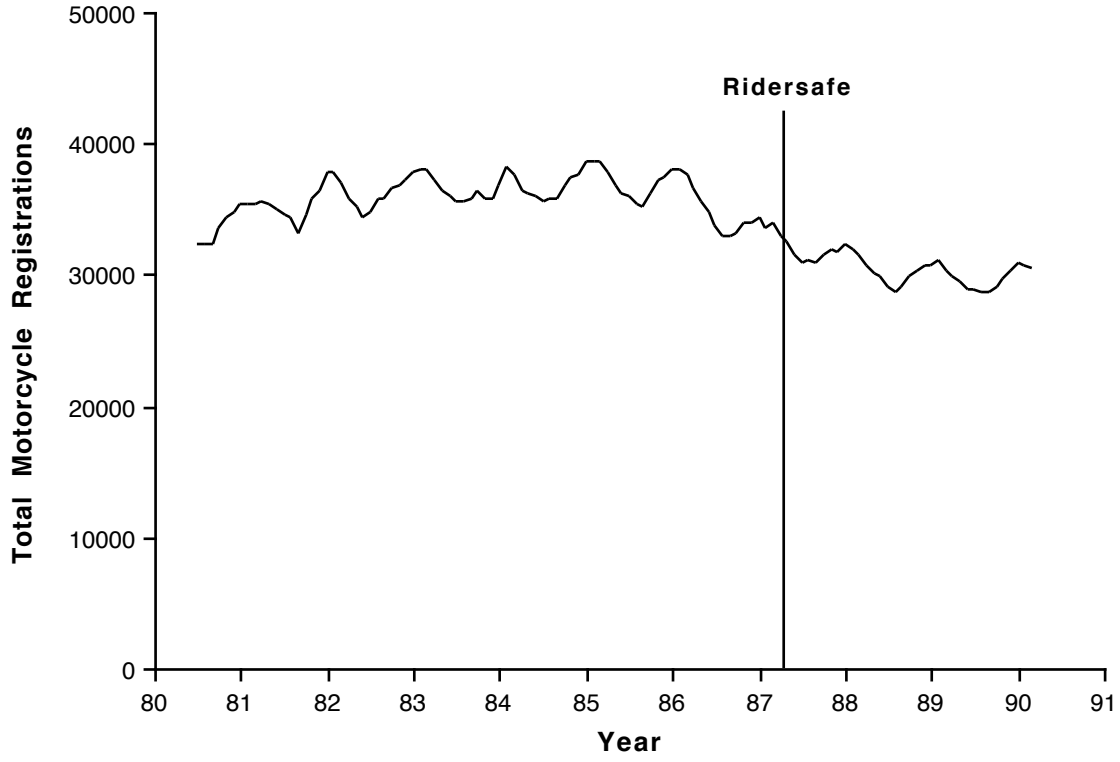


The considerable variation in monthly figures and the general downward trend since 1983 make interpretation of the effect of the introduction of Ridersafe difficult. It does appear that the initial introduction of Ridersafe did not halt the general downward trend and may even have accelerated it slightly. However, by 1988 the monthly number of learner's permits issued appears to have stabilised and was increasing slightly by 1990.

5.2 Motorcycle Registration Trends

Two measures of motorcycle registration were collected. The total number of registered motorcycles in South Australia at one month intervals is shown in Figure 2 and the number of new motorcycle registrations each month is shown in Figure 3.

Figure 2. Total Motorcycle Registrations by Month

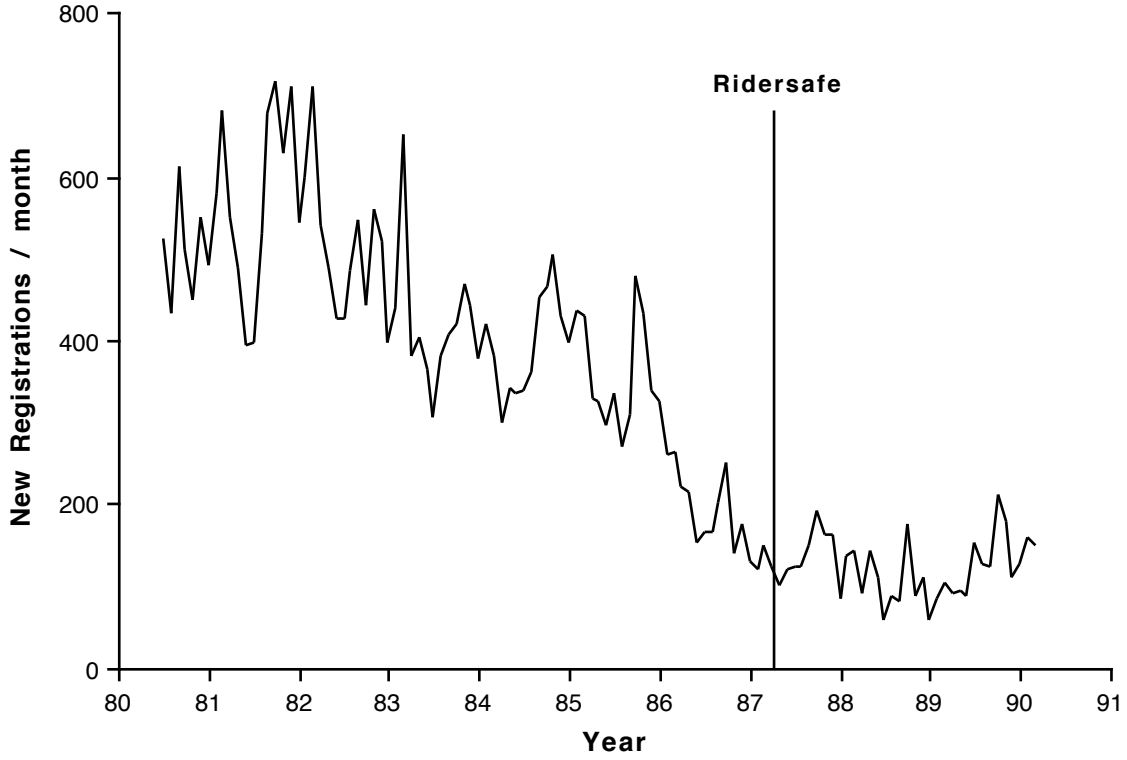


The total number of registered motorcycles (Figure 2) shows a slight flattening out in 1989-90 of the downward trend starting in 1985-86. However, given the small proportion that Ridersafe riders formed of the riding population over the time period examined, no major effect on the total number of registered motorcycles was expected.

The number of new motorcycle registrations per month (Figure 3) was declining rapidly before the introduction of Ridersafe. After Ridersafe was introduced it flattened out. However, it is virtually impossible to separate out any effects of the Ridersafe program from any other reasons

for the flattening out of the curve.

Figure 3. New Motorcycle Registrations per Month



5.3 Motorcycle Accident Trends

The number of motorcycle casualty accidents occurring each month in South Australia, and the rate per 1,000 registered motorcycles, before and after the introduction of Ridersafe is shown in Figures 4 and 5.

These measures of the frequency and rate of motorcycle accidents show no distinct changes associated with the introduction of Ridersafe. This is not surprising since the number of Ridersafe riders in their early stages of riding (where presumably they would show the most difference in accident rates) was very small compared to the total number of motorcycle riders, as noted above. Thus, any effects evident in the rates among Ridersafe riders would be swamped by the much larger general riding population accident rates.

Figure 4. Motorcycle Casualty Accidents per Month

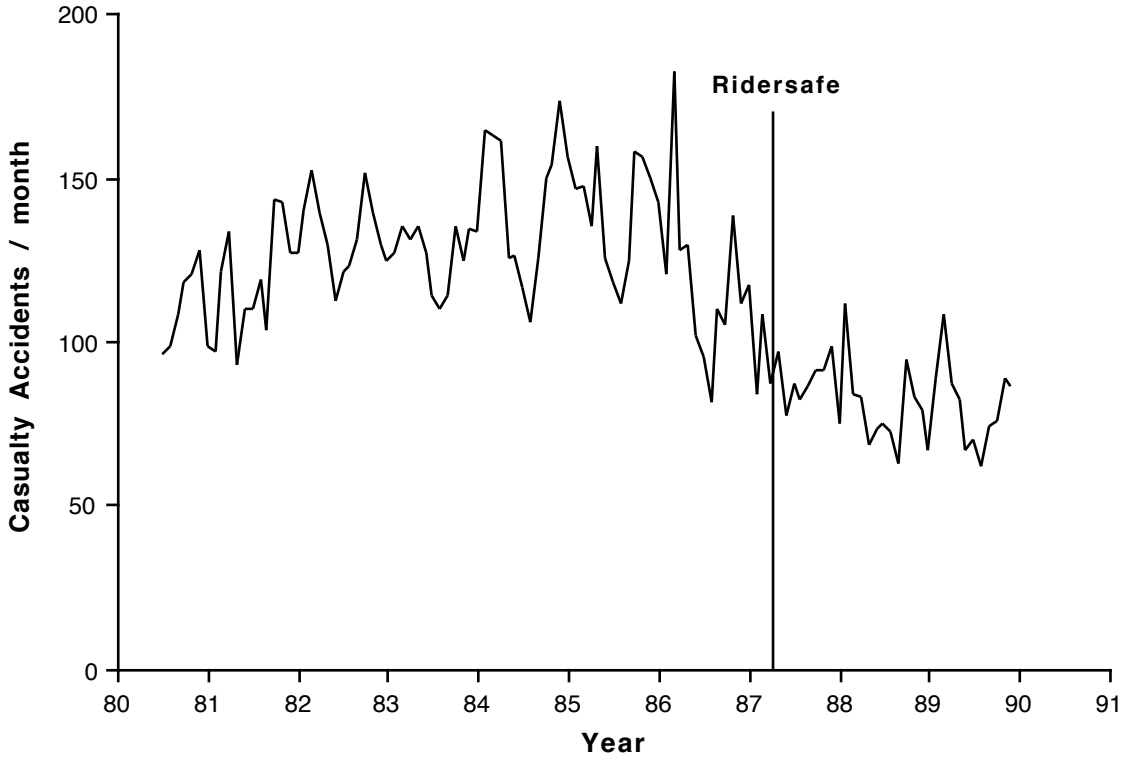
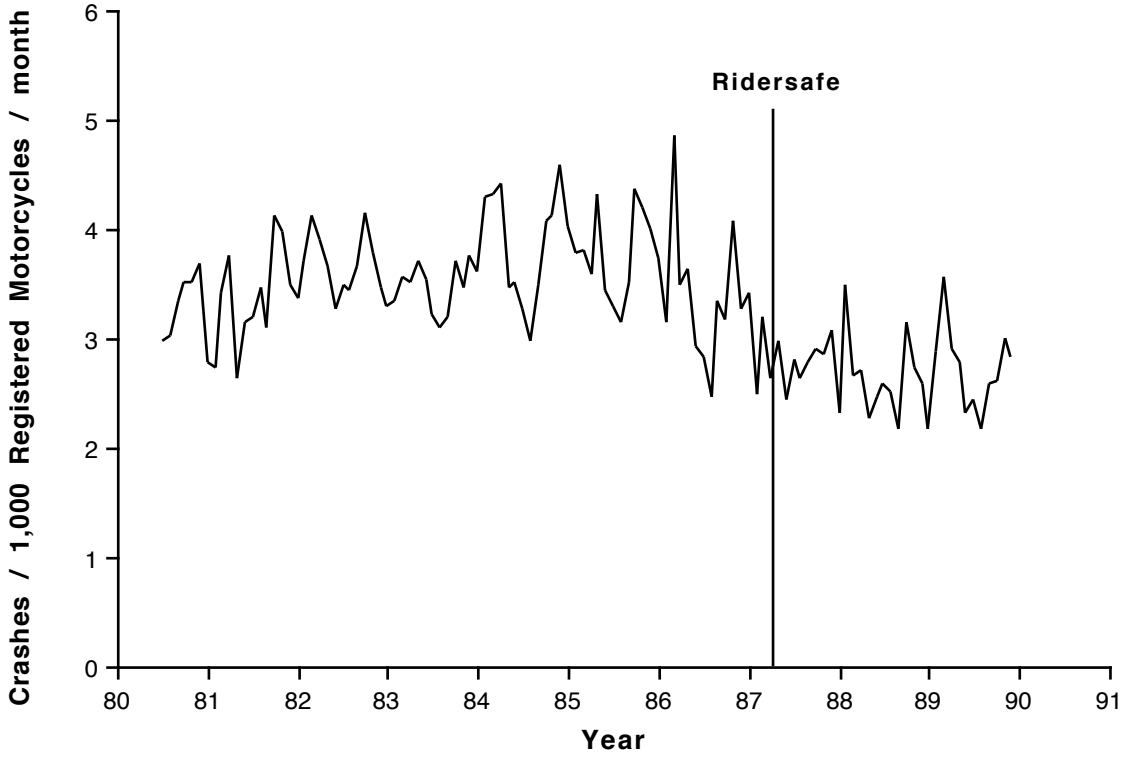


Figure 5. Crashes per 1,000 Registered Motorcycles per Month



6. DATA ON RIDERSAFE

A computerised database maintained by the Driver Development Centre records details of all persons taking Ridersafe courses. Data was extracted from this database on all persons who registered for a Session A course in 1987 or 1988. Data on the Session B and C courses for this group was examined up to the present day.

6.1 Completion Rates

The completion rates for the various sessions for this group are shown in Table 4.

Table 4. Completion Rates for Riders Attending Ridersafe courses

Result	Session A	Session B	Session C
Passed	99.0% (2,507)	97.1 (2,412)	97.6 (1,598)
Failed then passed	0.6 (16)	2.1 (52)	1.6 (27)
Failed	0.4 (10)	0.8 (20)	0.7 (12)
Total No.	2,533	2,484	1,637

During this period 2,533 people attended a Session A Ridersafe course. Most of them (97.3%) also successfully completed the Session B course and hence became eligible to obtain a motorcycle learner's permit. However, a much lower proportion (64.1%) of those who began Ridersafe, actually sat and completed the level two course (Session C). Although actual licence data for this group is not available, it can be stated that 65.9% of those who qualified for a motorcycle learner's permit (passed Session B) went on to qualify for a motorcycle P-plate licence (passed Session C).

7. IN-DEPTH ANALYSIS OF DATABASE

The database that was used in the first evaluation, which found a greater crash frequency among the Ridersafe group compared to the control group, was re-examined in detail.

7.1 The Origin of the Data

The in-depth data on motorcyclists and crashes used in the first evaluation were collected by the Road Safety Division of the South Australian Department of Transport, the forerunner of the

Office or Road Safety of the Department of Road Transport, in conjunction with the Registrar of Motor Vehicles. Details relating to a series of riders obtaining motorcycle learner's permits between May 1986 and June 1989 were recorded. Data was collected on their licence number, date of obtaining learner's permit, sex, date of birth, home postcode, whether they had taken Ridersafe, and the date of obtaining a probationary licence.

This data was then merged with crash data from the Traffic Accident Reporting System (TARS) database which is based on police accident report forms. The merging was done using the licence number of the sample group and the licence number recorded in TARS for riders of motorcycles involved in crashes. The accident data used in the matching included accidents up until 30 March 1989.

Probationary licence data was available to 20 June 1989.

7.2 Verifying and Updating the Data

The rider data was verified against the microfiche copies of the Motor Registration licence database since historical data have not been kept in a computerised format. The checking process was extremely time consuming so only a small sample (55 cases) was checked. The sex, birth date and learner's permit date were found to be completely reliable.

The home postcode was generally reliable although some differences were found, especially in the earlier cases (6 out of 55 postcodes were different). It appears that postcode was matched at a point in time after the collection of the original data, and so the recorded postcodes reflected this point in time rather than the time at which a learner's permit was issued.

The Ridersafe status of the riders was checked by obtaining the names of riders from the Motor Registration licence file and then searching for them in the Ridersafe database which contains the names of all persons who have attended Ridersafe sessions. The Ridersafe status was in general agreement between the two sources with some minor anomalies. All persons recorded as having taken Ridersafe appeared on the Ridersafe database (15 cases). However, there was 1 case out of 19 cases that was listed on the Ridersafe database but was recorded as having not taken the Ridersafe course.

A new set of crash data from the TARS database was obtained for the years 1986-1992. This showed agreement with the accident data previously matched. However, the extended period covered by this data allowed accident data to be available for the latter cases, which was not possible in the original database. The time between obtaining a learner's permit and a recorded crash was also calculated and taken into account, a procedure which could not be carried out with

the original data.

7.3 A Deeper Look at the Data

The original database contained 5,015 control riders and 1,946 Ridersafe riders who obtained motorcycle learner's permits. The updated crash data was used to obtain crash rates for both groups for the first year of riding after obtaining a learner's permit. It was found that 138 (2.8%) of the control group and 132 (6.8%) of the Ridersafe group had a crash in their first year of riding. This is a similar difference to the results originally found (1.8% crash frequency for controls vs 4.4% for Ridersafe), the higher percentages being due to the longer crash information period covered by the updated data.

This new result represents a 2.4 times increased crash risk for those riders who took Ridersafe compared to those riders who did not take it. This is a very substantial difference in an unexpected direction and warranted further investigation.

7.3.1 Rider addresses

As stated previously, Ridersafe was phased in by the postcode of a rider's home address, with city areas being assigned first. Table 5 shows the number of cases and crash rates for riders in the Adelaide metropolitan area (here defined as a postcode < 5170) and those in rural areas (11 riders with interstate postcodes were excluded). It can be seen that only a very small proportion of the rural group had taken Ridersafe (8.7%) compared to the metropolitan group (46.5%). Further, the risk of crashing in the first year of riding was greater in the metropolitan area than in rural areas. Given the small number of Ridersafe subjects in the rural areas and the large number of relatively low risk controls, it was decided to concentrate only on the metropolitan sub-sample to avoid artificially biasing the results with little gain in statistical power.

Table 5. Number of Cases and Crash Rate in the First Year of Riding by Region

	Metropolitan		Rural	
	Control	Ridersafe	Control	Ridersafe
Number of riders	1,895	1,645	3,112	298
Crash rate	4.2%	7.2%	1.8%	4.7%

It can be seen that, with the elimination of the riders in rural areas, the relative risk of a crash in the first year for the Ridersafe group compared to the controls now appears to be lessened to 1.7 times. This is still a very large difference, however, and in the opposite direction to the

expectations which led to the introduction of Ridersafe.

7.3.2 Further analysis of the control data

Since Ridersafe was phased in over time, there are really two control groups operating in this database. Those who obtained a learner's permit before the introduction of Ridersafe (pre-control group) and those after the introduction of Ridersafe (post-control group). While the pre-control group should consist of a sample of all riders obtaining learner's permits, the post-control group should only contain those riders exempted from Ridersafe either through having a specific postcode not covered by Ridersafe at the time or through having held a learner's permit previously.

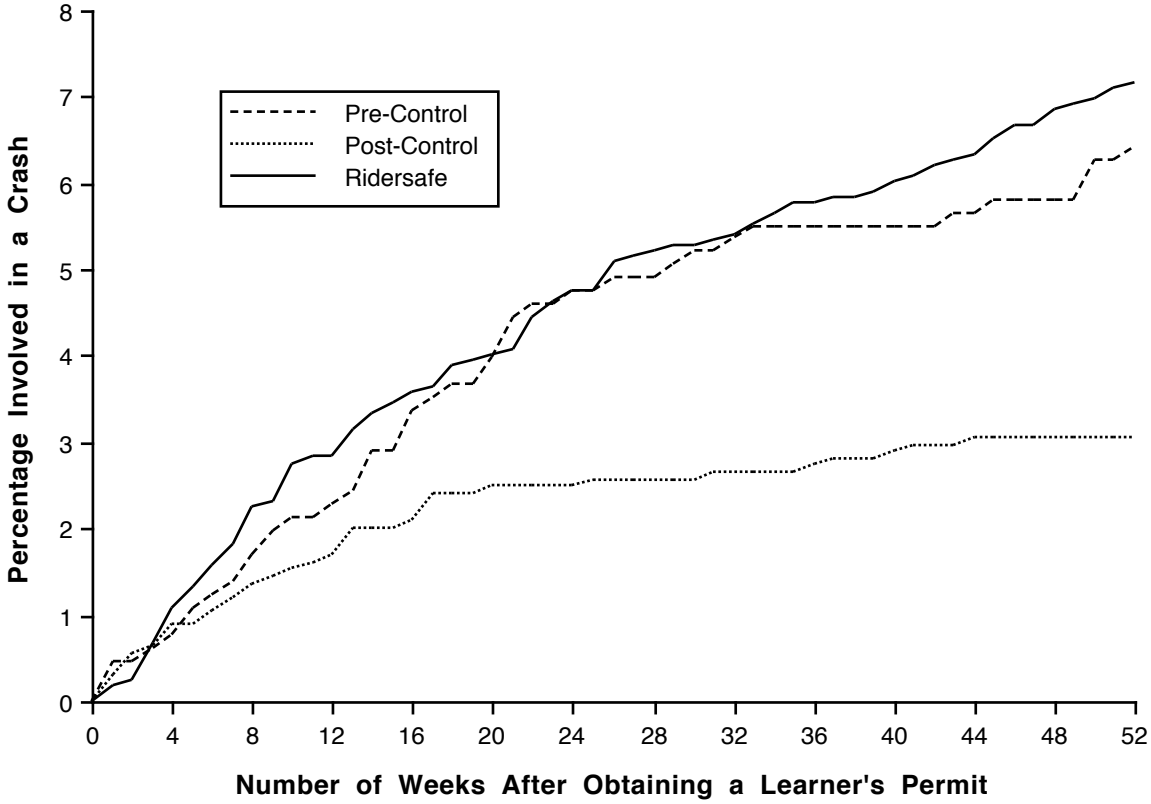
Table 6. Metropolitan Sample: Number of Riders Obtaining a Learner's Permit in a Given Month by Ridersafe Group

Year	Month	pre-Ridersafe control	post-Ridersafe control	Ridersafe
1986	may	6		
	jun	7		
	jul	32		
	aug	66		
	sep	91		
	oct	132		
	nov	134		
	dec	88		
1987	jan	47		
	feb	22		
	mar	20		
	apr	8	6	
	may		22	
	jun		67	
	jul		200	
	aug		255	
	sep		156	48
	oct		152	79
	nov		116	113
	dec		72	40
1988	jan		36	52
	feb		42	99
	mar		16	67
	apr		9	51
	may		7	83
	jun		8	38
	jul		7	64
	aug		11	90
	sep		10	51
	oct		9	45
	nov		12	114
	dec		14	122
1989	jan		2	54
	feb		8	125
	mar		5	80
	apr			46
	may			131
	jun			53
Total		653	1,242	1,645

It was found that there were 653 pre-controls and 1,242 post-controls to compare with 1,645 Ridersafe cases. Table 6 shows the dates that these riders obtained their motorcycle learner's permits and the group to which they were assigned.

The cumulative crash rates for each of these groups in their first year of riding are shown in Figure 6. At the end of a year, the crash rates for the pre-controls and the Ridersafe group were similar (6.4% and 7.2% respectively) while the crash rate for the post-controls was very much less (3.1%), even though it was initially very similar to that for each of the other two groups. The post-control crash rate began dropping after one month and virtually levelled out after four months.

Figure 6. Cumulative Crash Rates for the Ridersafe and Two Control Groups of Riders



7.3.3 Probationary licence acquisition

The effects outlined above suggested something very strange was happening with the post-control group. They appeared to virtually stop having crashes four months after obtaining their learner's permits.

This result led to an examination of the data on the acquisition of a probationary licence to ride a motorcycle in the original database. This data was originally thought to be corrupted or

incomplete due to a large number of missing dates. However, when it was broken down into the three groups in the study it was found that 289 out of 653 (44.3%) of the pre-controls, 631 out of 1,645 (38.4%) of the Ridersafe group and only 29 out of 1,242 (2.3%) of the post-controls were recorded as having gone on to get a probationary licence.

Since probationary licence data was only available up until June 1989 in the original data set, the number of probationary motorcycle licences obtained by both the Ridersafe group and the post-control group were certainly underestimates, but more so for the Ridersafe group than the post-control group.

In order to verify the database information that showed an almost complete lack of obtaining a probationary licence in the post-control group, a representative selection of 12 cases who were recorded as having not obtained a probationary licence was hand checked by Motor Registration. It was confirmed that none of these 12 riders had gone on to get a probationary motorcycle licence suggesting that the database is indeed accurate in this respect.

It therefore appears that the post-control group originally selected was anomalous in that only a very small proportion of them went on to get a probationary licence after obtaining their learner's permit. Assuming that most of them gave up riding before the expiration of their learner's permit, which is backed up by their crash history over time, this provides a likely explanation of their extremely low crash risk as, if they had given up riding, their exposure to the risk of being involved in a motorcycle crash would be reduced to zero. This means that they can not be used as a valid control group for the Ridersafe evaluation. The apparent crash risk increase originally observed for the Ridersafe group was due to this abnormal makeup of the post-control group.

The reason why the post-control group contained such an unusual group of riders could not be ascertained.

7.3.4 Comparing Ridersafe and pre-controls

While the actual probationary licensing rates for the pre-control group (44%) can only be assumed to be reasonably accurate the data needed to complete the probationary licensing rates for the Ridersafe group was not easily available. However, previous analysis of the Ridersafe database suggests that this should be around 65% and this is in rough agreement with the licensing rates observed in the database for the earlier Ridersafe riders.

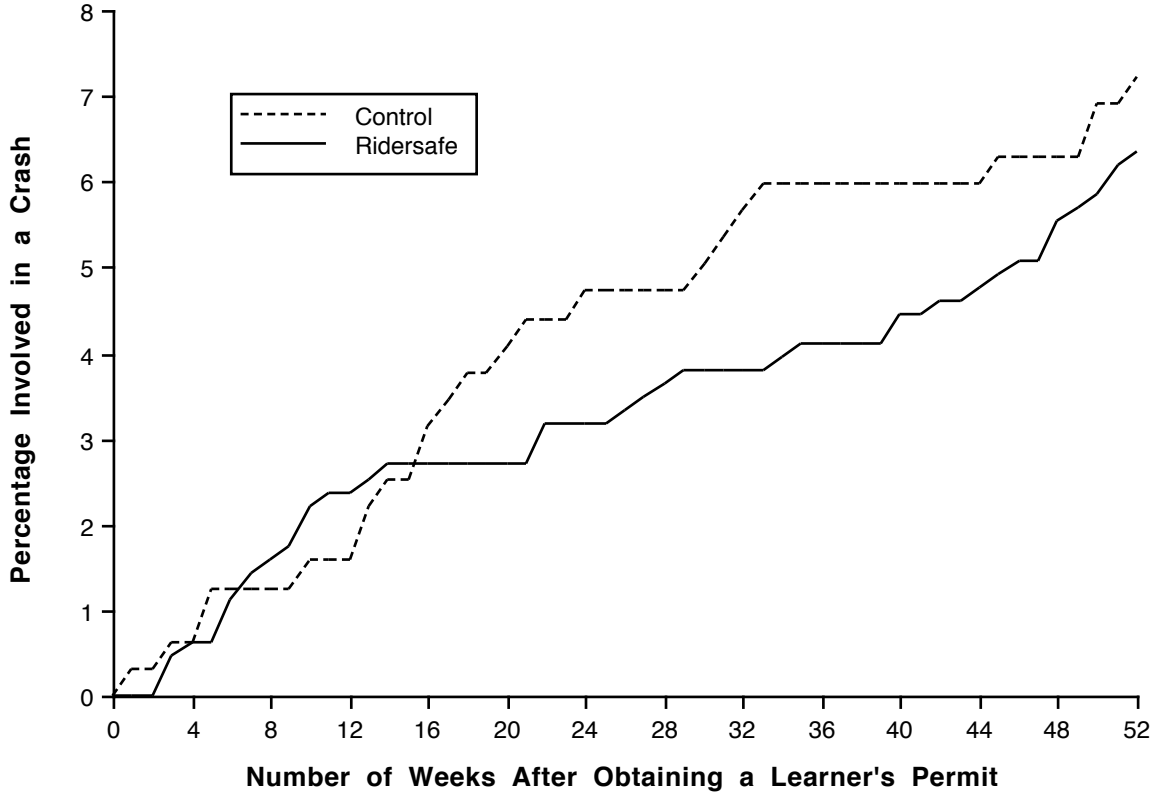
If both the pre-control group and the Ridersafe group are indeed representative of their respective populations, then the comparison shown in Figure 6 is probably reasonably valid, with

the slightly higher accident rate among the Ridersafe group being attributable to those riders being more likely to continue riding. However, given the problems noted above with the post-control group and therefore possibly with the pre-control group also, and the very small remaining sample sizes, there is no evidence in this data set to support a conclusion that Ridersafe has any effect on subsequent crash risk.

7.3.5 Comparison based on probationary licence holders

Probably the most comparable groups that can be extracted from the database are those in which the riders can be identified as having gone on to get a probationary licence. Of those that did: 23 out of 318 (7.2%) controls (pre and post) and 40 out of 631 (6.3%) Ridersafe riders were involved in a crash in their first year of riding. This represents 12% fewer crashes in the first year among the Ridersafe group than among the control group. However, it is emphasised that this difference does not even approach statistical significance (p=0.60) and could easily have appeared solely due to random variation in the samples so nothing conclusive can be said about the effect of Ridersafe. The figures are presented merely as a best guess using available reliable data. The cumulative crash rates for these two groups over their first year of riding are shown in Figure 7.

Figure 7. Cumulative Crash Rates for Ridersafe and Control Groups who Obtained Full Licences



When age and sex differences between the Ridersafe and control groups who went on to get a probationary licence were taken into account using logistic regression procedures it was found that Ridersafe in itself yielded only 8% fewer crashes in the first year of riding. Again this was not a statistically significant result.

7.4 Final Results

Detailed analysis of the database shows that there is no statistically significant effect on crash rates associated with the Ridersafe program. There are hints that the Ridersafe group was more likely to continue with riding once they started and that, given they continued, they may have been slightly safer riders than the control group. However, these differences could easily have occurred purely by chance.

7.5 Sample Size Issues

Given the original sample sizes of 1,946 Ridersafe cases and 5,015 controls only differences of 30% or more in the first year crash rates between the groups could reasonably be expected to achieve statistical significance (Table 7). This is a very large difference which would not be expected based on other work in the area. The level of statistical significance referred to here is $p<0.05$ (two-tailed) with a power of 80%.

Table 7. Sample Sizes Needed to Demonstrate Statistical Significance (see text)

% Difference	Sample Size
5%	81,498
10%	19,886
15%	8,620
20%	4,725
25%	2,944
30%	1,988
35%	1,419
40%	1,055
45%	808
50%	634

The sample size problem is exacerbated even more when the comparison is based on the more reliable data sets. The number of pre-controls for whom reliable information was available (653) only allows differences of 50% or greater to be detected at the above level of statistical

significance.

Even if all 2,500 riders who completed Ridersafe to the point of being able to obtain a motorcycle learner's permit in 1987 and 1988 were compared to a similar number of comparable controls, the crash rate difference between the two groups would have to be more than 25% to have a reasonable chance of demonstrating statistical significance.

Based on an estimate of 2,000 new motorcyclists per year, about 5 years of Ridersafe data (from 1987-1991) and a similar number of control years (from 1983-1987) would be needed to have a reasonable expectation of detecting a statistically significant 15% difference in crash rates between the two groups. This very long period adds the problem of changes in traffic and road conditions over that time making interpretation of the results even more difficult. There would also be practical problems in obtaining motorcycle learner's permit data for riders before 1987 as there is now no record that they got a learner's permit for a motorcycle rather than a car.

Therefore it is probably impossible to get sufficient data on which to base an adequate evaluation of the differing crash rates of Ridersafe and non-Ridersafe riders in South Australia.

8. CONCLUSIONS

This analysis of the data available on the introduction of Ridersafe in South Australia cannot show any effect of Ridersafe on safety, either positive or negative. The practical and scientific problems involved in collecting enough data to make a reasonable assessment of the effectiveness of Ridersafe appear to be insoluble. Previous analysis of the data which indicated that Ridersafe had a negative effect on safety has been shown to be invalid due to abnormal characteristics of a major part of the control group.

A number of positive things can be said about the Ridersafe program. It provides a consistent base level of training and knowledge for would-be riders and it keeps at least some riders off the road system until they can satisfy an instructor that they have at least a basic level of skill.

The results of overseas research in this area, although inconsistent, seem to indicate a small positive safety benefit associated with such programs, even if only through deterring potential riders from riding. However, it is not clear how this relates to the South Australian experience so no conclusive argument either for or against Ridersafe can be made based solely on road safety grounds.

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Appendix A. Summary of studies examining the influence of motorcycle rider training programs on accidents

Studies that found no effect of a training program on accidents

Author	Method	Main results	Comments	Quality
Jonah, Dawson & Bragg (1982)	Conducted in Ottawa. No. trained = 811. No. controls = 1,080. Training voluntary. Trained group drawn from graduates of a training program. Controls drawn from Ontario Motorcycle File. All subjects were licensed, active m/c riders. Used self-reported and official accident data over a four-year period.	Using discriminant analysis, with age, sex, time licensed, distance travelled in last 4 yrs, education, whether rode m/c after drinking, entered as covariates, training was not predictive of accident involvement.	Study well executed with appropriate analysis.	Good
Mortimer (1984)	Conducted in Illinois. No. trained = 213. No. controls = 303. Training voluntary. Trained group drawn from riders who had graduated from a training course during a three year period. Controls obtained through m/c dealerships. All subjects were active m/c riders. Self-reported accident data over a one-year period, not necessarily immediately after training in the case of those trained.	Trained group appears to have a higher accident rate than controls within some subgroups formed on the basis of age and years licensed. (Not tested for statistical significance.) However, training was not reported to be predictive of accidents in a multiple regression analysis.	Control group more experienced, likely to be m/c enthusiasts. Analyses incompletely reported. Comparisons of accident rates not properly adjusted for age and years licensed; other potential confounders not taken into account. Study design means that serious accidents are not included.	Problems
Mortimer (1988)	Repeat of above study with a larger sample size. No. trained = 914. No. controls = 500.	See above.	See above.	Problems
Adams, Collingwood & Job (1985)	Conducted in Sydney (using Australia Post employees). No. trained = 93. No. controls = 63. Training offered to telegram delivery riders only in selected districts. Controls were riders from remaining districts. Used self-reported accident data for six months before and after training.	Trained group had a lower accident rate than controls *prior* to training. About 30% of those selected for training did not attend; these riders had a higher accident rate than those who attended training. No stat. sig. difference between the pre-training and post-training accident rates of those who attended training.	Study had very low statistical power. Likely to be important differences between those attending training and other riders.	Problems

Studies that found no effect of a training program on accidents (continued)

Author	Method	Main results	Comments	Quality
Cooper & Rothe (1988)	Conducted in British Columbia. No. trained = 418. No. controls = 459 (including 57 who had failed a training course). Training voluntary. All subjects obtained through a telephone survey. Accident data from official reports over a seven-year period.	Using discriminant analysis, with rider characteristics, attitudes and exposure controlled for, training was not found to influence accident involvement.	No details were obtained from subjects on the nature or duration of the formal training undertaken. There was sufficient control for confounding variables in the analysis.	Good
New York State Department of Motor Vehicles (1988)	Conducted in New York State. Random assignment of licence applicants to four conditions. (1) Current knowledge and skills tests; N = 6,604. (2) New knowledge test and Motorcycle Operator Skill Test Version II (MOST II); N = 6,248. (3) New knowledge test, MOST II, and three hours of training; N = 6,616. (4) New knowledge test, MOST II, and 20 hours of training; N = 6,995. Accident data from official reports over a two-year period.	Groups had different licensing rates: Group 1 - 35%; Group 2 - 29%; Group 3 - 25%; Group 4 - 26%. Accident rates examined at five time points. *Overall*, non-m/c accident rate for Group 1 was lower than rates of other groups for up to 18 months, but no sig. differences w.r.t. m/c accidents. Considering *only those who became licensed*, no sig. differences in accident rates. Trained groups no better at MOST II than Group 2.	A significance level of 10% was used rather than the conventional 5%. A large number of statistical tests were performed, so the few stat. sig. results may just reflect chance variation. Differences in attrition rates may have led to important differences in the composition of the groups eventually becoming licensed.	Results not released officially. Reports of serious problems with execution.

Studies that found a decrease in accidents associated with a training program

Author	Method	Main results	Comments	Quality
Anderson, Ford & Peck (1980)	Conducted in California. Random assignment of licence applicants to three conditions. (1) Standard procedure (knowledge test and skill test); N = 15,080. (2) Improved knowledge test and Motorcycle Operator Skill Test (MOST); N = 12,634. (3) Improved knowledge test, MOST with remedial training for those who failed it; N = 13,160. Accident data from official records for a period of 18 months or, in two-thirds of the cases, two years.	Groups had different licensing rates: Group 1 - 46%; Group 2 - 31%; Group 3 - 33%. *Overall*, accident rates for Groups 2 and 3 consistently lower than that for Group 1. Largest difference at one year: Group 2 - 15% less; Group 3 - 21% less. Considering *only those who eventually became licensed*, no difference between the accident rates of Groups 1 and 2, but Group 3 had a rate 22% lower at 6 months and one year. Considering only those who failed MOST on the first attempt, those offered remedial training had an accident rate 22% lower (borderline stat. sig.) than those who failed MOST but did not have access to remedial training.	Overall differences in accident rates were largely due to potential riders being deterred from becoming licensed. Not clear whether this was due to MOST itself or due to the test facilities being inconveniently located. Evidence of a separate, albeit small, effect of training. Differences in attrition rates may have led to (unrecognised) differences in the composition of the groups becoming licensed. The study was well reported and analysed appropriately.	Good
Lakner (1984)	Conducted in Illinois. No. trained = 495. No. controls = 511. Training voluntary. Trained group drawn from graduates of training course. Controls obtained from a list of m/c licence holders. Used self-reported accident data over a one year period.	Only 57% of the trained group and 84% of the controls were licensed, active riders. These sub-groups presumably used for comparisons. Accident rate for trained group: 1.6 per 100,000 miles. Rate for controls: 3.6 per 100,000 miles. (Not tested for statistical significance.)	Small sample. Other than exposure, no differences between the groups were taken into account. Study design means that serious accidents are not included.	Problems
McDavid, Lohrmann & Lohrmann (1989)	Conducted in British Columbia. No. trained = 139. No. controls = 139. Training voluntary. Trained group drawn from graduates of training program. Controls drawn from Bureau of Motor Vehicle records, matched to cases on age, time and place of licensing, and previous accident history. Accident data from official reports over a five-year period.	Compared to their matched controls, trained riders had 22% fewer accidents of all types and 64% fewer m/c accidents, but these differences were not stat. significant. Using discriminant analysis, age, licensing location, previous accident history and training were predictors of involvement in *accidents of all types*. Training was not a predictor of m/c accidents alone.	Small sample. Number of accidents not adequate for detailed analysis. Matching on previous *reported* accidents does not ensure pairs of riders equally safety-conscious m/c riders. Differences in exposure after licensing were not taken into account.	Problems

Studies that found a decrease in accidents associated with a training program (continued)

Author	Method	Main results	Comments	Quality
Billheimer (1991) (see also Wilson, Covitz & Hannigan, 1992)	Conducted in Los Angeles. Two approaches used. (1) Analysis of trends in accidents etc. since intro. of training program in July 1987 which became mandatory for licence applicants <18 yrs from 1/1/88 and those <21 yrs from 1/1/91. (2) Comparison of accident experience of 534 matched pairs of trained riders and controls. Trained group drawn from graduates of a training program. Controls obtained from locations frequented by m/c riders. Cases and controls matched for age, sex, years riding, miles ridden per year, primary reason for riding. Accident data from official records over 12 month periods (ongoing).	No. licensed riders <25 yrs fell by 19% after program introduced (had been falling anyway). After program intro., fatal m/c accidents fell by 32%, all m/c accidents by 33%. For those <25 yrs, fatal m/c accidents per licensed rider rose 1982 - 1986 but fell to 1982 level within four years of program intro. Fatalities per registered m/c fell by 18% in California c.f. 10% in rest of US. Casualties per registered m/c fell by 18% in California c.f. 15% in rest of US. No stat. sig. differences between accident experience of first 131 matched cases and controls, but sample size too small. After 534 pairs accumulated, accident rate for those who had less than one year of experience and took training was lower than that of their controls in the first six months following training. No detail available; sample still considered too small.	Changes in licensing rates hamper interpretation of results. Increase in <25 yrs fatalities prior to intro. of program needs better explanation before decrease can be attributed to program. Evidence that program was a deterrent to becoming licensed. Data collection regarding matched pairs to continue.	Problems

Studies that found an increase in accidents associated with a training program

Author	Method	Main results	Comments	Quality
Raymond & Tatum (1977)	Conducted in England. No. trained = 190. No. controls = 627. Training voluntary. Trained group drawn from graduates of a training program. Controls drawn from provisional m/c licence applicants. Self-reported accident data over a one-year period.	Taking into account distance travelled, the trained group had a higher accident rate than the controls. Detailed analyses showed that this difference was only present where riders had travelled less than 5,000 miles.	Control group drawn from a population of more experienced riders than trainees. Statistical analysis not sophisticated enough to control for differences between groups which may have influenced the accident rate independently of training. Study design means that serious accidents are not included.	Problems
Osga (1980)	Conducted in South Dakota. No. trained = 818. No. controls = 329. (Numbers reduced in matched analyses.) Trained group drawn from graduates of a training program. Controls drawn from various sources: file of previous research participants; m/c dealerships; word-of-mouth; new applicants for training. Used self-reported and official accident data over varying periods.	Survival rate analyses were used to compare the accident experience of different groups in thousand-mile intervals of riding exposure. Comparison of a group that completed training with a group that attempted but did not pass the course showed no differences in accident experience, either prior to or following the course, and whether or not group members were matched (on age, sex, amount of in-town riding and course location). Comparison of a group of course graduates and a control group (that had not undertaken formal training) matched for age, sex, amount of in-town riding and location, showed that the trained group had stat. sig. more accidents in some intervals of miles ridden *before* training was undertaken and stat. sig. more accidents in most of the mileage intervals following completion of training.	Survival analyses not done in the standard manner. The matching of course graduates and controls did not produce comparable groups (in terms of pre-course accident experience), so there is uncertainty in interpreting differences in post-course accident experience. Study design means that serious accidents are not included.	Problems

Appendix B

All Postcodes Covered by Ridersafe as of July 1994

5000	5052	5113	5168	5265	5354	5472
5006	5061	5114	5169	5271	5355	5473
5007	5062	5115	5170	5272	5356	5480
5008	5063	5116	5171	5273	5357	5481
5009	5064	5117	5172	5275	5360	5482
5010	5065	5118	5173	5276	5361	5483
5011	5067	5120	5174	5277	5371	5485
5012	5066	5121	5201	5278	5372	5486
5013	5068	5125	5202	5279	5373	5487
5014	5069	5126	5203	5280	5374	5490
5015	5070	5127	5204	5290	5400	5491
5016	5072	5131	5210	5291	5401	5493
5017	5073	5132	5211	5301	5410	5495
5018	5074	5133	5212	5302	5411	5501
5019	5075	5134	5213	5303	5412	5502
5020	5076	5136	5214	5304	5413	5510
5021	5081	5137	5231	5306	5414	5520
5022	5082	5138	5232	5307	5415	5521
5023	5083	5139	5233	5308	5416	5522
5024	5084	5140	5234	5309	5417	5523
5025	5085	5141	5235	5310	5418	5540
5031	5086	5142	5236	5311	5419	5550
5032	5087	5144	5237	5312	5420	5552
5033	5088	5150	5238	5320	5421	5554
5034	5089	5151	5240	5321	5422	5555
5035	5090	5152	5241	5322	5430	5556
5037	5091	5153	5242	5330	5431	5558
5038	5092	5154	5243	5331	5432	5560
5039	5093	5155	5244	5332	5433	5600
5040	5094	5156	5245	5333	5451	5601
5041	5095	5157	5250	5340	5452	5602
5042	5096	5158	5251	5341	5453	5608
5043	5097	5169	5252	5342	5454	5609
5044	5098	5160	5253	5343	5455	5641
5045	5106	5161	5254	5344	5460	5700
5046	5107	5162	5255	5345	5461	5710 *
5047	5108	5163	5256	5346	5462	
5048	5109	5164	5259	5350	5463	
5049	5110	5165	5260	5351	5464	
5050	5111	5166	5261	5352	5470	
5051	5112	5167	5264	5353	5471	

* Stirling North Only

Appendix C

Detailed Time Breakdown of Ridersafe Session A

Activity	Lecture	Video	Riding	Nothing
Introduction	17			
Video on controls		11		
Clothing and helmets	2			
Video on preparation to ride		8		
Safety gear and starting the bike	16			
Video on starting bike		4		
Rules for riders on course	1			
Move to course				5
Finding controls on bike			6	
Walking bikes			4	
Getting on the bike			2	
Demo of putting bike on centre stand	7			
Putting bike on stand and positioning			3	
Sitting on pushed bikes			6	
Starting and stopping bike			3	
Finding friction point			7	
Walking bike with clutch			6	
Slow riding			5	
Riding bike in first gear			9	
Break				7
Turning, braking and gears	5			
Video on turning braking and gears		7		
Move to riding range				3
Demo of turning	2			
Turning corners			7	
Changing gears demo	4			
Gear changing			4	
Weaving demo	5			
Weaving			5	
Circling demo	5			
Circling and weaving			7	
Head check talk	2			
Moving inside				2
Braking and tyres	13			
Reaction time and braking distance	11			
Video on braking	7			
Discussion of video	2			
Move to range				2
Looking at brakes	5			
Braking exercise			5	
Quick stop talk	3			
Quick stop exercise			6	
Finishing remarks	1			
Put away bikes				3
Total (minutes)	**108**	**30**	**85**	**22**
Total %	44.1%	12.2%	34.7%	9.0%

Appendix D

Detailed Time Breakdown of Ridersafe Session B

Activity	Lecture	Video	Riding	Nothing
Introduction and recap	2			
Lane positioning	4			
Dealing with cars	3			
Conspicuity and headlights	3			
Mirrors	1			
Looking ahead on road	2			
Field of vision	2			
Intersections	4			
Defensive riding (SIPDE)	2			
Street strategies		14		
Going over hills	2			
Description of exercises	3			
Move onto track				4
Introduction	1			
Refamiliarisation with bikes			5	
Description of exercise	2			
Moving into and out of large oval			10	
Description of exercise and demo	3			
Doing tight U-turns			23	
Description of exercise	3			
Gear changing (1-3) around large oval			6	
Description of exercise and demo	3			
All riders figure 8 in 2nd gear			7	
Description of exercise	4			
Lane changing with indicator + others			5	
Break				11
Introduction on braking	1			
Braking and corner taking	11			
Counter steering	2			
Advanced turning and braking		9		
Braking with rear brake locked	2			
Riding conditions and problems		10		
Pillion passengers	1			
Moving out to track				2
Description of exercise and demo	4			
Braking practice - rear and both brakes			17	
Description of exercise and demo	4			
Braking in a curve			12	
Description of exercise	2			
Surprise braking			7	
Description of exercise and demo	5			
Counter steering with surprise			7	
pack up bikes				5
Recap	6			
Maintenance video		12		
Total (minutes)	**82**	**45**	**99**	**22**
Total %	33.5%	18.4%	40.4%	9.0%

Appendix E

Detailed Time Breakdown of Ridersafe Session C

Activity	Lecture	Video	Riding	Nothing
Introduction and review	6			
Video on tactics of riding		15		
Protective clothing discussion	2			
Description of assessment procedures	2			
Move to range				5
Introduction	3			
Warm up ride			3	
Slow riding demo	2			
Slow riding exercise			3	
Weaving demo	3			
Weaving exercise			6	
Slalom demo	4			
Slalom exercise			6	
Weaving around oval demo	5			
Weaving around oval exercise			7	
Reverse direction oval demo	1			
Reverse direction oval exercise			4	
Talk on checking head and feet	2			
Break				16
Cornering	9			
Braking	2			
Video on braking and balance		10		
Discussion of video	3			
Move to range				3
Cornering and gears demo	3			
Cornering and gears exercise			11	
Braking at a point demo	4			
Braking at a point exercise			6	
U-turn and start/stop demo	4			
U-turn and start/stop exercise			8	
Riding over obstacles demo	3			
Riding over obstacles exercise			4	
Skill assessment walk-through	8			
Prepare for assessment				2
Course testing (8 riders 2 at a time)			13	
Braking testing (8 riders 1 at a time)			4	
Move in				3
Alcohol and drugs	2			
Pillion passengers	2			
Video on alcohol and drugs		13		
Concluding remarks	4			
Paper work				10
Total (minutes)	**74**	**38**	**75**	**39**
Total %	32.7%	16.8%	33.2%	17.3%