MOTORCYCLE RIDER SAFETY PROJECT

SUMMARY REPORT

Report to Queensland Department of Transport and Main Roads

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Preface

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Executive Summary

Motorcycle trauma is a serious issue in Queensland and throughout Australia; the fatality rate per 100 million kilometres travelled for motorcycle riders in Australia is nearly 30 times the rate for drivers of other vehicles (Australian Transport Safety Bureau, 2002). In 2009, the then Queensland Transport (later the Department of Transport and Main Roads or TMR) appointed CARRS-Q to provide a three-year program of Road Safety Research Services for Motorcycle Rider Safety. Funding for this research originated from the Motor Accident Insurance Commission. This program of research was undertaken to produce knowledge to assist TMR to improve motorcycle safety by further strengthening the licensing and training system to make learner riders safer by developing a pre-learner package (Deliverable 1), and by evaluating the Q-Ride CAP program to ensure that it is maximally effective and contributes to the best possible training for new riders (Deliverable 2), and identifying potential new licensing components that will reduce the incidence of risky riding and improve higher-order cognitive skills in new riders (Deliverable 3).

Deliverable 1 demonstrated that there is no effective learner licence period for most new Queensland motorcyclists, with half of those obtaining a licence having held a learner licence for less than 27 days. Yet the apparent crash experience of learner riders is concerning. The challenge for implementing a pre-learner package in Queensland is that Q-Ride currently functions as a de facto pre-learner course, with many trainees having little or no previous on-road riding experience. Without significant changes to motorcycle licensing requirements, the most straightforward option for a pre-learner package was identified as a computer-based program that would replace the learner knowledge test.

Deliverable 2 sought to examine how to best assess the competencies of motorcycle riders within a licensing context and to review how this was currently being undertaken in Queensland in comparison with approaches taken elsewhere. The literature review found that competency-based training and assessment of motorcycle riders is uncommon in other jurisdictions and so few evaluations of its effectiveness are available. The content of the Q-Ride competencies was supported by the literature and expert opinion, although the potential to expand the competencies to better measure higher order skills such as hazard perception and attitudes to risk taking was identified. Further opportunities for refinement of Q-Ride and the CAP were identified: (1) improvement of collection and recording of data from Q-Ride training and assessment audits to better monitor and review the CAP process; (2) collection of measures of rider skill and proficiency which could be linked to CAP information to assess how well particular competencies are contributing to rider skill and proficiency; and (3) linking data collected as part of the CAP with crash information to undertake an outcome evaluation to determine which competencies are related to later crash involvement.

Deliverable 3 sought to identify approaches to motorcycle training and licensing interventions directed at risk taking or hazard perception and to provide recommendations on how these interventions may be incorporated into the existing licensing systems in Queensland (Q-SAFE and Q-Ride) at both the pre-learner and pre-licence phases. It

concluded that the content of the hazard perception program should include recognising and predicting the behaviour of other road users, recognising road-based hazards and how to select and implement the most appropriate response. The content of the program for reducing risk taking behaviour should focus on factors underlying risk taking such as sensation seeking and self-monitoring, rather than focusing on the direct effects of factors such as alcohol, speeding, and non-use of protective clothing. An integrated approach to addressing hazard perception and risk taking should be adopted where the emphasis is on intervening at multiple points in the riding history, rather than a single "inoculation" approach.

However, one of the constraints to drawing firm conclusions from the research was the lack of scientific evaluations of current motorcycle safety initiatives both in Australia and internationally. There is simply not strong enough evidence that particular programs or requirements are effective in reducing the occurrence or severity of motorcycle crashes. Most programs or initiatives that have been implemented have not been evaluated well or at all. Many experts and stakeholders hold views regarding what is effective, but there is little evidence available to assess these claims.

The lack of firm evidence on which to base programs is particularly challenging given the finding emerging from the research that programs (whether pre-learner or addressing hazard perception or risk taking) need to be implemented in a mandatory fashion in order to ensure that they reach all of their target audience. There does not appear to be the demand among riders and would-be riders for additional programs that would involve both time and monetary cost.

Table of Contents

MOTORCYCLE RIDER SAFETY PROJECT SUMMARY REPORT

1. INTRODUCTION

Motorcycle trauma is a serious issue in Queensland and throughout Australia. Motorcyclist fatalities in Queensland peaked at 73 in 2007 and while the numbers have decreased in following years, they remain 20% or more of the road toll (BITRE, 2011). More than 30% of road trauma victims admitted to Queensland hospitals in 2006-07 were motorcyclists (Henley & Harrison, 2009). The number of motorcyclist deaths and injuries has accompanied an increase in the popularity of motorcycling. Across Australia, the number of motorcycles registered increased by 48% from 2006 to 2011 (ABS, 2011), the strongest growth of any vehicle type in Australia. From a public health perspective, the increase in motorcycling presents an enormous challenge because motorcycle riders and their pillion passengers are especially vulnerable in crashes. The fatality rate per 100 million kilometres travelled for motorcycle riders in Australia is nearly 30 times the rate for drivers of other vehicles (Australian Transport Safety Bureau, 2002).

In 2009, the then Queensland Transport (later the Department of Transport and Main Roads or TMR) appointed CARRS-Q to provide a three-year program of Road Safety Research Services for Motorcycle Rider Safety. Funding for this research originated from the Motor Accident Insurance Commission. The research was conducted against a backdrop of changes in motorcycle licensing and training practices in Queensland. The competency-based training and assessment alternative to obtaining a motorcycle licence in Queensland (Q-Ride) had been introduced in August 2001 and a range of changes to both how this process was administered and requirements for motorcycle licensing occurred both before and during the process of the research. While many of these changes were expected to have long-term impacts on motorcycle licensing and safety, the delays inherent in crash data meant that the ability to examine outcomes in terms of crash risk was limited. These changes also meant that some of the original requirements of the project were amended by TMR during the course of the project to better reflect newer priorities (and findings of the project to date).

1.1 AIMS AND REPORTING

The research was undertaken to produce knowledge that will assist TMR to improve motorcycle safety by further strengthening the licensing and training system to make learner riders safer by developing a pre-learner package (Deliverable 1), by evaluating the Q-Ride Consistent Assessment Process (CAP) program to ensure that it is maximally effective and contributes to the best possible training for new riders (Deliverable 2) and by identifying

potential new licensing components that will reduce the incidence of risky riding and improve higher-order cognitive skills in new riders (Deliverable 3).

Reports were written summarising each of the three main deliverables of the project. For each deliverable, detailed reports were prepared for each task. The titles of all of these reports are presented in the Reference List at the end of the current document. This document was prepared at the request of TMR to provide a concise summary of the findings of the overall project to allow them to be communicated more widely. The aims, methods and results of Deliverables 1, 2 and 3 are presented in Sections 2, 3 and 4, respectively. The overall findings are discussed in Section 5.

2. SUMMARY OF FINDINGS REGARDING PRE-LEARNER MOTORCYCLE LICENSING PACKAGE

While fatality and injury rates for learner drivers are typically lower than for those with intermediate licences, this pattern is not found for learner riders (RTA, 2010a). It is therefore imperative to improve safety for learner riders. Pre-learner training aims to ensure that the rider obtains a level of basic riding knowledge and skills in a relatively safe off-road environment before obtaining a learner permit and riding on the road. At present there is no requirement for pre-learner motorcycle rider training to be undertaken to obtain a motorcycle learner permit in Queensland. The potential for improving the motorcycle learner and licence scheme by introducing a pre-learner motorcycle licensing and training scheme within Queensland was investigated in this deliverable.

The first deliverable of the project was entitled "Methodology for development of a pre-learner motorcycle licensing package". Deliverable 1 included a literature review, analysis of learner motorcyclist crash and licensing data, and development of a potential pre-learner motorcycle rider program.

2.1 IMPROVING THE SAFETY OF LEARNER MOTORCYCLISTS AND APPROACHES TO PRE-LEARNER MOTORCYCLE PROGRAMS

This section presents information from Deliverable 1.1 *Literature review of issues related to improving the safety of learner motorcyclists and approaches to pre-learner motorcycle programs* (Rowden & Haworth, 2009). The aims of the review were to examine safety issues pertaining to learner riders and to identify approaches to safety programs that may be suitable for riders wishing to obtain their learner permit with a view to identifying best practice to be applied within the Queensland context.

Approaches to pre-learner programs for motorcyclists are founded within a graduated licensing process with the aim to reduce risk for motorcyclists. Both the Australian (Haworth, & Mulvihill, 2005) and US (NHTSA/MSF, 2000; Baldi, Baer & Cook, 2005) best practice models for motorcycle licensing incorporate training for learner riders. They highlight that pre-learner programs are part of a broader, interactive system that impacts on the safety of riders at each stage as they progress in their riding careers.

With the exception of some new European programs, current pre-learner programs for motorcyclists focus predominantly on providing basic skills training in a comparatively safe off-road environment. Programs vary in terms of whether they are mandatory or voluntary, the duration of training, and assessment protocols. Unfortunately, there is no specific evidence for the effectiveness of any particular program. Similarly, jurisdictions vary in the restrictions applied during the learner period. Pre-licence programs are only widespread where they are mandatory or where they are perceived by riders to facilitate passing an assessment that is required to receive the learner permit. Thus, pre-licence programs cannot be divorced from the structure of the licensing system.

Based on the findings of the literature review, there appears considerable scope for the improvement of traditional rider training in terms of content, delivery protocols, and the structuring of training within an overall graduated licensing system. Programs to address learner rider safety not only have potential to protect riders through the learner phase, but also provide them with appropriate skills and behaviour management strategies for their entire riding career. Nevertheless, without clear evidence for the effectiveness of any pre learner program, an evaluation would need to be conducted. However, given the relatively small number of crashes involving learner motorcycle riders in Queensland it is quite possible that any program may not deliver a measurable effect. Nevertheless, this limitation could be overcome with the implementation and evaluation of a national program which would have greater potential to deliver measurable effects (due to larger crash numbers).

Delivering training in stages within a graduated licensing system is important as learners may be more able to integrate information learnt from training once they have had some riding experience as opposed to the pre-licence stage where there is potential for 'information overload' due to the cognitive resources required in initial skill acquisition (Christie et al., 2004). Additionally, there is more potential that the information will be personally relevant to them (and hence internalised and retained) once some experience has been gained. However, there is much information that could potentially benefit riders from the outset.

Whilst a pre-learner program is limited by the level of information that trainees can actually process and internalise, the course curriculum must contain sufficient content to maximise safety. Research suggests that it probably requires about four days of training to take a completely novice rider to a stage at which they could be considered adequately safe to be allowed to ride unsupervised on the road (Haworth & Smith, 1999). However, there is little real or perceived demand for such a comprehensive (and necessarily expensive) course in the Australian context. For this reason the balance between learner rider safety and riders' lack of willingness to invest in safety requires consideration in a voluntary system. Whilst a four day course can include coaching the rider from basic to more advanced skills, pre-learner programs in most jurisdictions focus on basic vehicle control and manoeuvring, with more advanced skills taught during subsequent training to obtain a provisional licence.

2.2 ANALYSES OF CRASH AND LICENCE DATA FOR LEARNER MOTORCYCLISTS

This section presents information from Deliverable 1.2 *Analysis of Crash and Licence Data for Learner Motorcyclists* (Haworth, Rowden & Schramm, 2011). The report aims were to:

1. Analyse licensing data to examine the current characteristics of learner motorcyclists;

2. Analyse crash data to develop a profile of crashes involving learner and newly licensed motorcyclists; and,

3. Use the above information to identify if there are particular situations or locations in which learner motorcyclists are over-involved in crashes that can then be targeted in a pre-learner package.

The analysis of licensing data found that half of the riders obtaining a motorcycle licence in Queensland held their learner licence less than 27 days. More than 90% of novices obtain their licence through Q-Ride which has no minimum learner period (unlike Q-SAFE has a mandatory minimum learner period of 180 days and NSW and VIC which have a minimum of three months). This means that Q-Ride effectively functions as a pre-learner program given that most trainees have held a learner licence for a very short period of time and have little or no riding experience as a learner.

Learner riders can be easily identified in the crash data, but newly licensed riders are hard to identify because most are granted open, rather than provisional, licences. Learner riders appear to be involved in more severe crashes and to be more often deemed at fault than fully-licensed riders but this may reflect problems in reporting (under-reporting of less severe crashes and police tendencies to consider learners to be at fault, respectively) rather than real differences. Some of the differences between learner riders and fully-licensed riders appear to reflect differences in riding patterns of younger riders (e.g. more riding in built-up areas where the potential for intersection crashes is greater), rather than increased risks relating to inexperience. The analysis of contributing factors in learner rider crashes suggests that hazard perception and risk management (in terms of speed and alcohol and drugs) should be included in a pre-learner program. However, the short time the learner licence is held poses serious constraints upon delivery of a pre-learner program.

2.3 OBSERVATIONS OF EXISTING PRE-LEARNER TRAINING IN SELECTED JURISDICTIONS

This section presents information from Deliverable 1.3 *Observations of existing pre-learner training in selected jurisdictions* (Rowden, Wishart & Haworth, 2011). Current pre-learner programs were observed in New South Wales and Victoria to inform the development of any new pre-learner program in Queensland. This section describes each of the two observed programs, highlighting potential advantages and disadvantages of each for application in the Queensland context.

Similar content was generally covered in the NSW and Victorian courses. Safety outcomes for learner riders from both of the observed courses remain unknown; however it appears that both courses facilitated sound learning of basic vehicle handling skills in accordance with their central aims. The duration of the pre-learner training courses varied in each state, as did the manner in which riders were assessed and the overall approach to licensing (mandatory training vs. voluntary). It is therefore apparent that most differences lie between the licensing systems more so than the training content *per se*. This issue should primarily guide future discussions with Queensland stakeholders regarding implementation options.

Neither course included an on-road training component and, despite efforts to simulate a road ride, arguably did not provide the level of training that the current Q-Ride system does (as it includes an on-road component). However, the structure of both the NSW and Victoria motorcycle licensing systems dictates that further assessment is required at the pre-licence stage, three months (minimum) following the pre-learner stage. Incidentally, while a brief

road ride is included in the NSW mandatory pre-licence training; neither system has a strong focus on actual road riding.

In consideration of the abovementioned issues the current NSW system may provide the most useful framework for developing future pre-learner training and assessment in Queensland. However, pre-licence training and assessment may require further investigation. Components of the NSW pre-learner phase that may prove useful are:

- mandatory training (with some remote area exemptions);

- standardised curriculum delivered across all service providers;

- all riders complete the same course irrespective of previous riding experience;

- course delivered over two days (consecutive if possible; 3.5hrs per day);

- all skills training is conducted off-road on a designated bitumen range; and

- assessment is formative (akin to competency-based) and does not include a summative test.

Additionally, the NSW course is subsidised which is a matter for consideration for the Queensland context with regard to how this may influence the uptake of riding versus a more costly system that may have benefits for reduced crashes through exposure control (people electing not to ride).

Other components of the NSW pre-learner phase that require *further development* for their application in the Queensland context are:

- the simulated road ride (does not currently progress beyond 2nd gear); and

- the relatively limited time spent on hazard perception and risk taking issues.

2.4 STAKEHOLDER INTERVIEWS REGARDING PRE-LEARNER MOTORCYCLE RIDER PROGRAMS

This section presents information from two rounds of stakeholder interviews regarding pre-learner motorcycle rider programs, (Deliverable 1.4a: Buckley, Rowden, Haworth & Wishart, 2011 and Deliverable 1.4b: Rowden, Buckley, Haworth & Wishart, 2010b). The aim of the interviews was to examine the views and expert opinions of a sample of Q-Ride rider trainers and TMR licensing examiners regarding potential content, delivery and operational issues for the development and delivery of pre-learner motorcycle rider programs in Queensland.

The first round of interviews found general support for introduction of a pre-learner training program, with detailed comments being offered regarding potential content (particularly by Q-Ride participants). Participants thought that the content should be similar in rural and metropolitan areas and that it should include both vehicle handling skills and traffic skills. One of the issues that was not resolved was which content topics should be left for the licensing training.

The second round interviews focused on implementation issues. Most interviewees favoured a pre-learner licensing package modelled on current Q-Ride delivery practices such as

competency-based training and assessment outsourced to accredited organisations. However, they believed that completion of the pre-learner program should be mandatory (Q-Ride is not mandatory). The views obtained from this study are mainly consistent with implementation issues that arose from the first round of interviews, however they further clarified that whilst on-road training and practice is valued, off-road training is the only practical approach for pre-learner programs.

Any future introduction of pre-learner training in Queensland would require stakeholder support. The results of this study indicate that ongoing efforts are required to inform stakeholders of broader issues relevant to pre-learner training as well as continued consultation with RSPs regarding final program development.

2.5 DEVELOPMENT OF A PRELIMINARY PRE-LEARNER MOTORCYCLE RIDER PROGRAM

This section presents information from Deliverable 1.5 *Development of a preliminary pre-learner motorcycle rider program* (Haworth, Rowden, Buckley & Wishart, 2010a). It built on the previous deliverables to inform the content to be included as well as a range of implementation issues such as assessment components, format, likely costs and effectiveness, tailoring the package depending on the characteristics and location of the learner and the implications for licence-level training and testing. The development of the preliminary package was also informed by the findings of Deliverable 3 *Investigation into Motorcycle Safety Interventions*.

2.5.1 Options for program delivery

CARRS-Q developed an optimal model for motorcycle licensing and training and then presented three pragmatic options for implementation of a pre-learner program within Queensland to TMR.

Option 1 was a mandatory face-to-face program which is likely to be supported by the rider training and testing industry and was expected to have broad reach. However, there is insufficient research evidence of likely effectiveness to justify the mandatory requirement and the cost to all learner riders.

Option 2 was a voluntary face-to-face program which is likely to be supported by the rider training and testing industry but have limited reach because take-up rates may be low.

Option 3 was a computer-based module that would replace the current motorcycle learner licence knowledge test and, for maximum effectiveness, be mandatory.

Discussions with TMR revealed a preference for a staged approach to introducing pre-learner initiatives that provides the opportunity for trialling lower-cost options prior to the gradual implementation of those initiatives that require more significant resources and justification for implementation. Thus, further development of Option 3 was undertaken.

Unfortunately, the proposed computer-based module cannot ensure that basic riding skills are obtained prior to the learner licence being issued, however it incorporates components addressing factors recognised in the literature as related to high risk; risk taking, hazard perception and protective clothing. Option 3 is compatible with both Q-Ride and Q-SAFE. Learner applicants could complete the electronic module then obtain a learner licence to progress to Q-Ride (immediately if they choose) or progress to Q-SAFE testing following the current six month minimum learner period applied to that licensing stream. One particular benefit of Option 3 is that potentially it can be applied in remote area, whereas face-to-face programs rely on services being provided in these areas (which currently do not exist for Q-Ride).

If mandatory face-to-face training is considered at a later date, the vehicle control skills component of the course could be supplemented with elements from Option 3, adapted to suit face-to-face presentation. The effect on exposure (i.e. the uptake of motorcycling) of the introduction of any particular program cannot be conclusively determined, however it is likely that a subsidised program may result in higher uptake rates (and potentially lower rates of those who progress to licensing).

2.5.2 Content of the preferred program

A five-step program suitable for computer delivery was developed with a rationale for the inclusion of each objective, how each step is linked to specific learning outcomes, and program content to achieve this. In line with the research evidence, the interactive nature of the program is central to achieving the desired learning outcomes. For similar reasons, short exercises and feedback are included rather than just presentation of information. The five steps are:

1. Introduce the program and engage students in the learning process

2. Provide knowledge of common motorcycling hazards, road positioning, and survival space

3. Enhance understanding of responsible riding attitude and self-management strategies to reduce risky rising behaviours.

4. Foster an appreciation of the differences between riding off-road and riding in the traffic environment for different types of motorcycles (i.e. transition to the road).

5. Create an understanding of the benefits of different types of protective clothing and strategies to overcome potential barriers for non-use (e.g. heat)

2.6   FEEDBACK ON THE PRELIMINARY PRE-LEARNER PACKAGE

Deliverable 1.6 was entitled *Workshops to gain feedback on the preliminary package.* At the request of TMR, a presentation of the results from the Deliverable 1 tasks, culminating in the development of the potential options for a pre-learner training package, was made to internal TMR stakeholders in July 2011. After the presentation, the group discussed opportunities and barriers for the implementation of a pre-learner training package in Queensland. The

stakeholders recommended not proceeding with the further development of a pre-learner package at this stage, based upon the current lack of evidence supporting the effectiveness of the pre-learner package options.

3.   SUMMARY OF FINDINGS FROM REVIEW OF CONSISTENT ASSESSMENT PROCESS (CAP)

The structure of motorcycle training and licensing systems has been shown to greatly affect the safety of on-road motorcyclists (Baldi, Baer & Cook, 2005). Central to the success or failure of such systems is the need for sound licence assessment practices. Deliverable 2 sought to examine how to best assess the competencies of motorcycle riders within a licensing context and to review how this was currently being undertaken in Queensland in comparison with approaches taken elsewhere. Given the breadth of changes that had occurred prior to the commencement of the project and ongoing amendments to processes, the approach to this deliverable was restructured from that specified in the original deliverable to maximise its usefulness from both policy and operational perspectives. The tasks undertaken for Deliverable 2 were a review of previous recommendations, a review of the literature and consultations with motorcycle licensing and training experts regarding best practice in competency-based training and assessment and, finally, development of an evaluation framework for the Continuous Assessment Process (CAP).

The Consistent Assessment Process (CAP) was developed to provide a detailed framework for assessment within the Q-Ride system. The CAP was adopted in 2008 to not only establish clear assessment requirements across various service providers, but also as a vehicle for reporting and monitoring by the then Queensland Transport (now TMR) to ensure the maintenance of the Q-Ride competency standards.

3.1   REVIEW OF Q-RIDE REFORM IMPLEMENTATION

The aim of Deliverable 2.1, *Review of Q-Ride reform implementation* (Haworth & Rowden, 2009) was to review the status of implementation of Reforms 3, 4, 5, and 6 recommended by Christie, Harrison and Johnston (2006) in their report to Queensland Transport (QT) entitled *Q-RIDE Curriculum Reform* in relation to how these issues have been addressed by QT (now TMR) and the extent to which the approach taken was consistent with the recommendations.

It should be noted that differences in the use of terminology between Christie and his colleagues and others have contributed to confusion and apparent disagreements. Specifically, Christie et al. use the term curriculum in a generic manner to identify learning outcomes that are addressed in a training program (similar to the way that others might use the term competencies). Others (including TMR) tend to use curriculum to refer to a formal document that specifies learning processes and the activities to be undertaken, time allotted and so on. Christie et al. also use the term competencies to apply to desired rider behaviours, regardless of how they are assessed. Others (including TMR) tend to be stricter in their use of the term, reserving it for identified target behaviours in a CBTA approach. Related to their wider use of the term competencies, Christie et al. also describe licence training and testing systems in some other parts of Australia as CBTA approaches, despite the use of licence tests in these systems.

Reform 3 related to reforming the curriculum specifications for Q-Ride. The review concluded that Reform 3 was implemented with the introduction of the CAP which included a breakdown of each of the competencies specified in the Q-Ride Competency Standards document (QT, 2007) and the requirement that rider trainers sign off on each group of sub-competencies when assessed.

Reform 4 refers to the need to 'train the trainers' in delivery of Q-Ride and the related assessment protocol. Deliverable 2.1 concluded that whilst Q-Ride rider trainers have been provided with a resource to assist them in the application of the CAP, it appears that no formal face-to-face training program was implemented by TMR to ensure rider trainers were initially familiar with the specific requirements of the CAP upon introduction. Informal training is also provided annually at the Q-Ride Industry Development Day held at the Mt Cotton Training Centre. Remedial action in the form of auditor feedback is provided to trainers during the training and assessment audit by TMR (which occur at least every second year according to the audit guidelines) to assist in correcting any curriculum delivery and assessment issues. The potential problem with this approach is that incorrect training and assessment or non-compliance may happen in the interim.

Reform 5 recommended that suitable guidelines for training ranges be developed and enforced by QT. TMR now requires RSPs to submit specifications of off-road training sites (including a map of location and photographs) at the time of accreditation. This is further inspected at the time of a training and assessment audit and non-compliance duly addressed by issue of Corrective Action Requests (CARs). As part of Reform 5 it was also recommended that legal contracts be drafted between QT and RSPs to formalise expected standards of performance and associated sanctions for breach of such standards. The Queensland Government response to the Parliamentary Travelsafe Inquiry rejected this recommendation as it deemed that existing accreditation processes were sufficient. Recommendations for administration of Q-Ride related specifically to the creation of a Chief Motorcycle Instructor position with extensive expertise to oversee Q-Ride. This has not taken place to date. It was also recommended that additional costs to administer Q-Ride should be recouped from RSPs via a competency certificate issuing fee or a flat annual fee. To date neither of these options has been implemented.

Recommendations regarding audits appear to have been addressed with increased requirements for auditing RSPs (annually) and individual rider trainers (every 2 years). For RSPs this includes scheduled compliance audits, training and assessment audits, records maintenance audits, and non-compliance audits. Reform 6 also recommended that Operational Reviewers should be granted the power to issue on-the-spot Corrective Action Requests. According to TMR, auditors currently have the power to do this.

3.2   REVIEW OF DEVELOPMENTS IN BEST PRACTICE FOR MOTORCYCLE COMPETENCY-BASED TRAINING AND ASSESSMENT

The second component of Deliverable 2 was to compare the riding competencies contained within Q-Ride to those competencies purported to represent best practice in competency-based motorcycle rider training and assessment. This comprised three sub-tasks. Deliverable

2.2a, *A review of developments in best practice for motorcycle competency-based training and assessment: comparisons to Q-Ride* (Haworth & Rowden, 2011) reviewed the literature on competency-based motorcycle rider training and assessment in order to identify best practice for CBTA for motorcyclists; and ascertain if current Q-Ride assessment competencies are both necessary and sufficient to ensure safe motorcycle riding. Deliverable 2.2b, *Motorcycling competencies – consultation with national and international motorcycle training and licensing experts,* (Haworth, Rowden & Buckley, 2011) sought to obtain the views of national and international experts regarding which specific riding competencies within a CBTA framework may either improve or negatively impact on the safety of riders once licensed; and to document any evidence to support their opinions. Deliverable 2.2c, *Comparing Q-Ride competencies with best practice: summary of research findings,* (Rowden & Haworth, 2011) combined the results of Deliverables 2.2a and 2.2b.

The review of the literature found that most rider training programs are of a set duration with a summative skills test for assessment and therefore do not qualify as CBTA. Therefore it was not surprising that no evidence for any effect of CBTA on safety for motorcyclists or indeed car drivers over and above traditional licence testing was found. This is primarily due to the lack of research and the difficulties associated with empirical evaluation. It was also established that CBTA needs to be considered in the context of the broader licensing system to maximise learning opportunities over time. Motorcycle rider licensing systems dictate how often training should take place during an individual's riding career and, in a graduated system, to what extent training at each stage should be applied and what factors should be incorporated in training programs to meet licensing requirements. The licensing system essentially specifies what is taught in training by specifying assessment standards. This is because the aim of motorcycle training is generally to facilitate sufficient competency/knowledge to pass the request test, hence, the importance of assessment standards that predict subsequent safety outcomes. However, the unfortunate paradox currently exists that it is unknown which specific competency-based assessment components for motorcycling indeed provide a protective effect and which do not.

Given the lack of evaluations of safety outcomes, best practice for CBTA in rider licensing and training cannot be clearly identified. For this reason, the components of three well-accepted existing training and licensing programs or state-of-the-art new programs were therefore compared with Q-Ride. These programs were: the US Motorcycle Safety Foundation Basic Rider Course; the Initial Rider Training Project model from Europe; and the Victorian motorcycle training and licensing program in Australia. It was found that the elements of Q-Ride competencies are reflected in common practice in the other three motorcycle training and licensing programs reviewed. To this end, it can be concluded that the current Q-Ride competencies are necessary inclusions in novice rider training and licensing. However, the information reviewed suggests that the current competencies are not sufficient. Further important aspects may be added to Q-Ride (or further elaborated upon) to ensure training provides a basis for safe riding in the traffic environment once licensed. Specifically, Q-Ride may benefit from more detailed focus on developing competencies regarding:

- Hazard perception;

- Progression to on-road riding and developing roadcraft (riding in traffic) skills through on-road experience in a range of situations; and,

- Attitudes to risk-taking.

Furthermore, as Q-Ride is placed within an overarching licensing system, there is scope to enhance when training and assessment need to be undertaken (in a graduated manner) during the initial stages of riding. Developing separate pre-learner and provisional licensing courses for motorcyclists would require reconsideration of the appropriate placement of riding competencies within these courses, but would provide scope for more focus on hazard perception, on-road experience and risk-taking. This has potential to maximise the information retained from training in order to enhance the safety of riders.

3.2.1 Consultation with national and international motorcycle training and licensing experts

Eighteen national and international experts responded to a request to provide feedback relating to seven core questions regarding motorcycle training and licensing, as well as two Q-Ride documents: *Q-Ride Competency Standards (2007)*, and *Q-Ride Consistent Assessment Process (2008)*. The experts from ten countries included academic researchers in motorcycle safety and rider/driver training; government administrators of rider licensing systems; and members of road safety organisations.

The overwhelming theme apparent from the responses of the entire sample was that ***there is no clear evidence to show that particular competencies result in subsequent safety for riders***. Where competencies were suggested as beneficial by most respondents their rationale was based on either:

1. factors that have been shown to contribute to crashes (and riders should therefore learn how to manage or avoid them);

2. personal opinion based on prior experience (i.e. this is the way we do it); or

3. competencies that relate to licensing issues other than direct crash involvement (e.g. committing an illegal act).

Collectively, these comments reflect how rider training and licensing systems have been developed to date. These comments also reflect the paucity of empirical evidence regarding the predictive validity of any particular existing competencies. Broader licensing issues such as the structure of graduated training and licensing for motorcyclists and whether or not training should be mandated within such a system were also considered. No clear consensus was expressed for these issues. In addition, it appears that CBTA for rider training and licensing does not have a high level of support from experts although some can see its value for individual learning, at least at a conceptual level.

In conclusion, experts held varied views on what constitutes an ideal framework for rider training and assessment. In essence, best practice for each expert may merely reflect their

personal involvement with these issues rather than evidence-based practice. On this basis it appears that competency standards for assessment may not be able to be aligned with what should ideally be learnt in regard to rider behaviour. Nevertheless, there was general support for the inclusion of basic riding skills and roadcraft.

3.3 OPPORTUNITIES FOR FURTHER REFINEMENT OF THE CONSISTENT ASSESSMENT PROCESS (CAP)

The remaining tasks in Deliverable 2 focused on better understanding how the Consistent Assessment Process is operating and how it can be improved. In Task D2.3, the *Implications of findings for the further refinement of the CAP* were developed at a workshop of the CARRS-Q project team where the outcomes of Tasks D2.1 and D2.2 were examined and implications for the future refinement of the CAP were identified, discussed and documented. Deliverable 2.4 comprised the *Development of a framework for ongoing review and improvement of CAP.*

The workshop noted that the content of the competencies that are assessed appears to be supported by the literature and expert opinion, although potential exists to expand the competencies to better measure higher order skills such as hazard perception and attitudes to risk taking. The program of research to date has not examined the *application of the CAP*. That is, it remains unknown if RSPs and ARTs are indeed following the process of assessment to the optimal degree or whether the process itself is optimal from a pragmatic point of view (i.e. any room for improvement in a practical operational sense or if the procedure is well understood by RSPs and ARTs).

The CAP is a strategy which is designed to contribute to the objectives of an overarching program, which is Q-Ride. The objectives of Q-Ride are stated as "to ensure participants reach a demonstrated level of skill and proficiency as a motorbike rider" with a goal of "enhancing road safety" (both quotes from Q-Ride web page http://www.tmr.qld.gov.au/Licensing/Getting-a-licence/Motorbike-licence/Q-Ride.aspx). If the usual evaluation framework was applied to the CAP, a process evaluation would examine whether the CAP provides a consistent process for assessment of Q-Ride applicants, an impact evaluation would examine whether the CAP ensures that Q-Ride applicants reach a demonstrated level of skill and proficiency as a rider, and an outcome evaluation would judge whether Q-Ride as a whole is reducing the crash and injury risk of new riders. As part of developing the evaluation framework, the following steps were taken:

1. identifying issues affecting CAP
2. examination of audit data
3. identifying potential improvements
4. developing a framework

Two sources of information regarding the issues affecting the CAP were examined by the researchers. The first source of information was the comments of Registered Service Providers that were provided as part of the consultations undertaken regarding both possible pre-licence programs and interventions to reduce risk taking and improve hazard perception.

The second source of information was spreadsheets summarising the outcomes of Q-Ride audits undertaken by TMR.

During the interviews with stakeholders regarding pre-learner training and interventions to address risk taking and hazard perception RSPs expressed unsolicited concerns regarding being audited against the CAP rather than being audited against their accredited programs which had been approved as part of their Q-Ride accreditation. This raises the issue of distinction between standardised curricula versus standardised assessment criteria. Whilst the CAP represents a set of standardised assessment criteria for Q-Ride, no standardised curriculum exists. Hence, confusion may arise between TMR and the RSPs regarding what the audits aim to do. Whilst this issue is not central to the agreed program of research, it has serious implications for the refinement of the CAP. That is, if the content of the CAP is refined but the process of application is not, then outcomes may be compromised.

One of the major issues affecting the CAP identified from discussions with TMR and review of documentation was the large number of recent changes in the regulatory framework. Some of the changes occurred in response to the recommendations of the Travelsafe Inquiry into Q-Ride, while others related to modifications to motorcycle licensing requirements. The changes to the rules also affected what the auditors were required (or allowed) to audit.

The second major issue identified as affecting the CAP was the volatility in the system. A large number of RSPs from the past are no longer trading but about 18% of these RSPs went on to trade under a different company name. The relationship between ARTs and RSPs is complex and changing. Some RSPs employ many trainers, while some ARTs work for multiple RSPs. Therefore individual trainers are in reality the unit of auditing, rather than the RSP per se.

Several challenges to the auditing process were also identified. Most audits did not cover all aspects of the CAP because auditors could only audit the activities that were being undertaken on the day that they visited. In addition, the restrictions on the availability of TMR auditors resulting from workloads associated with auditing other schemes, meant that the frequency of audits recommended in the audit guidelines was difficult to maintain.

3.4 PROPOSED FRAMEWORK FOR ONGOING REVIEW AND IMPROVEMENT OF THE CAP

The proposed framework for ongoing review and improvement of the CAP comprises a process evaluation component (improvements to recording and monitoring of audit information) and potential extensions to monitor Q-Ride impact and outcomes.

3.4.1 Process measures

Currently, the main process for providing information for ongoing monitoring and review of the CAP is the range of audits specified in the Q-Ride Audit Guidelines (2008a), particularly the training and assessment audits. To maximise the usefulness of the information gathered in these audits, the following recommendations are made:

1. Development of a clear coding framework to simplify analysis of audit results;

2. Clear labelling and definition of fields in the audit database;

3. Quality control on data entry;

4. Regular monitoring of extent of compliance with the CAP;

5. Development of a documented audit strategy including Registered Service Provider (RSP) and Accredited Rider Trainer (ART) sampling designs; and

6. Production of an annual summary of audit results that summarises audit frequencies and compares these with those specified in the guidelines, identifies any issues that have arisen in terms of the CAP and suggests strategies to address these.

3.4.2 Potential for impact and outcome evaluation

The potential exists to link some of the data collected as part of the CAP with crash information for use in an outcome evaluation. The lack of a systematic and ongoing measure of the skill and proficiency of riders limits the potential for impact evaluation. However, if some opportunity arose to collect this information, then linking it to CAP information might provide useful insights into how well particular competencies are contributing to rider skill and proficiency.

4. SUMMARY OF FINDINGS REGARDING MOTORCYCLE SAFETY INTERVENTIONS

There have been many calls for motorcycle rider education programs to address safety attitudes and motives and/or hazard perception in addition to riding skills to enhance the safety of riders (Haworth & Mulvihill, 2005; Jonah, Dawson & Bragg, 1982; Watson et al., 1996). However, reviews of motorcycle rider training have concluded that the vast majority of existing training focuses on vehicle-handling skills with comparatively little attention to higher order cognitive factors (Haworth, Smith, & Kowadlo, 2000; Sudlow, 2003). While skills-based training teaches riders to control a motorcycle, existing programs may fail to teach riders responsible self-management strategies and also fail to sufficiently develop hazard perception skills.

The third deliverable of the research project sought to identify approaches to motorcycle training and licensing interventions directed at risk taking or hazard perception and to provide recommendations on how these may be incorporated into the existing licensing systems in Queensland (Q-SAFE and Q-Ride) at both the pre learner and learner phases. This report presents the findings from the four research deliverables which were completed between March 2009 and July 2010:

- Review of the literature (Deliverable 3.1, Rowden & Haworth, 2009b)

- Assessment of alternatives identified in the literature for incorporation into current Queensland motorcycle licensing schemes (Deliverable 3.2, Rowden & Haworth, 2009a)

- Interviews with Queensland motorcycle safety stakeholders (Deliverable 3.3a Buckley, Haworth, Rowden & Wishart, 2009, Deliverable 3.3b Rowden, Buckley, Haworth & Wishart, 2010a)

- Development of recommendations (Deliverable 3.4, Haworth, Rowden, Buckley, & Wishart, 2010b)

4.1 REVIEW OF MOTORCYCLE SAFETY INTERVENTIONS

The first task in Deliverable 3 was to undertake a literature review of motorcycle safety interventions that address attitudinal and higher order cognitive skills. This involved a thorough literature review utilising current academic journal publications, industry specific training documentation, government and non government documentation relevant to motorcycle licensing.

Risk taking in motorcycling incorporates a variety of behaviours including deliberately not following road rules (including excessive speeding), drug and alcohol use while riding and riding un-helmeted. Training has the potential to play a very important role in reducing risk taking in motorcyclists but challenges remain in developing effective interventions. Horswill and McKenna (1998) found that hazard perception training for car drivers reduced their risk-taking propensity. Given that motorcyclists have been found to engage in more behaviours

known to increase crash risk (e.g., Horswill & Helman, 2001) than car drivers, it might be expected that the potential benefits of a hazard perception training program designed specifically for motorcyclists would be even more critical for this group.

4.2   CONCLUSIONS REGARDING MOTORCYCLE SAFETY INTERVENTIONS

From Deliverables 3.1 to 3.3, the following conclusions were drawn:

1. There are few and limited evaluations of programs addressing hazard perception and reducing risk taking in the literature. This constrains the ability to make firm and rigorous recommendations regarding implementing new programs. Instead, promising approaches have been identified and recommended for further investigation and/or trialling.

2. The ability to deliver widespread programs for improving hazard perception and/or reducing risk taking that are spread over time is severely constrained in the current licensing and training system by the very short duration of the learner period for most Queensland learners (median 27 days).

3. The take-up of post-licence training programs is small and therefore delivering hazard perception or risk taking programs by incorporation in post-licence training courses or through clubs is unlikely to have a wide reach and may arguably not target those who could most benefit.

4. In generating the recommendations, the emphasis was on ways of delivering hazard perception and risk taking programs that would fit with minimal or no change to the current Queensland motorcycle licensing and training system, before examining more options that might be more effective but would require more significant legislative or regulatory change.

5. Riders appear to be limited in the amount of resources they are willing to commit to improving motorcycle safety. This is reflected in the training programs being shorter than they are in some northern European countries where the expectations of the resources needed to create safer riders are much higher. The competitive environment in which Q-Ride operates exacerbates the constraints on time and money in relation to training.

6. Q-Ride trainers are skilled in helping trainees achieve the current competencies but they cannot be expected to develop new approaches without effective professional development, and implementation is more likely to occur and be consistent if programs are highly structured and materials provided. Trainers as a whole cannot be expected to possess the degree of expertise required for developing and delivering behaviour change programs.

7. There is a need to motivate both those who are delivering a program and those who are receiving it to both complete and assimilate the information. For example, we know that information that is going to be tested is a governing factor in ensuring material is taught.

8. The framework of competency based training and assessment poses great challenges for ensuring that material is covered if it is not directly tied to assessed competencies (which

is hard to do for higher-order skills) and for ensuring that sufficient time is devoted to programs.

9. Individual trainers play a crucial role in the delivery of programs to reduce risk taking. They are strong role models for trainees and if they do not value the aims of the program (e.g. do not personally accept the need to reduce speeds), then they may not deliver (or may not effectively deliver) the program.

4.3   RECOMMENDATIONS FOR MOTORCYCLE SAFETY INTERVENTIONS

As part of Deliverable 3.4, the following recommendations for motorcycle safety interventions were proposed:

1. The content of the hazard perception program should include recognising and predicting the behaviour of other road users, recognising road-based hazards and how to select and implement the most appropriate response.

2. The content of the program for reducing risk taking behaviour should focus on factors underlying risk taking such as sensation seeking and self-monitoring, rather than focusing on the direct effects of factors such as alcohol, speeding, and non-use of protective clothing.

3. It would be useful to consider packaging together the hazard perception and risk taking programs to increase uptake, particularly of the latter.

4. An integrated approach to addressing hazard perception and risk taking should be adopted where the emphasis is on intervening at multiple points in the riding history, rather than a single "inoculation" approach.

5. As one component of an integrated approach to hazard perception and risk taking, the potential for developing and implementing a DVD or web-based hazard perception training tool for Queensland riders should be investigated.

6. As one component of an integrated approach to hazard perception and risk taking, a module to address risk taking and hazard perception should be developed and trialled for incorporation in Q-Ride.

7. In addition to programs designed for delivery to all riders, the potential for a more extensive program that addresses risk taking for delivery to offenders should be examined.

8. Ways to increase the extent of on-road training to facilitate the development of hazard perception skills should be examined.

9. The potential for a tailored hazard perception and risk taking program for riders undertaking training to move from the RE to the R licence should be examined.

It should be noted that there is a fundamental difficulty in identifying best practice in motorcycle programs due to the lack of rigorous evaluations of the extent to which the programs achieve their stated aims. This makes it difficult to specify best practice in terms of curriculum, frequency and duration of training, learning aids, training venues and assessment

techniques. Best practice can only really be assessed in terms of the extent to which the program includes components which have been shown elsewhere or in theory to be beneficial (e.g. programs which embody the underlying concept of graduated licensing; i.e. that experience should be gained in low-risk situations before graduating to higher-risk situations). This is a drawback in many areas of motorcycle safety, not just in interventions to improve hazard perception or reduce risk taking.

5. DISCUSSION AND CONCLUSIONS

This program of research was undertaken to produce knowledge to assist TMR to improve motorcycle safety by further strengthening the licensing and training system to make learner riders safer by developing a pre-learner package (Deliverable 1), by evaluating the Q-Ride CAP program to ensure that it is maximally effective and contributes to the best possible training for new riders (Deliverable 2) and by identifying potential new licensing components that will reduce the incidence of risky riding and improve higher-order cognitive skills in new riders (Deliverable 3).

Deliverable 1 demonstrated that there is no effective learner licence period for most new Queensland motorcyclists, with half of those obtaining a licence having held a learner licence for less than 27 days. Yet the apparent crash experience of learner riders is concerning. The challenge for a Queensland pre-learner package is that Q-Ride currently functions as a de facto pre-learner course, with many trainees having little or no previous on-road riding experience. Without significant changes to the motorcycle licensing requirements, the most straightforward option for a pre-learner package was identified as a computer-based program that would replace the learner knowledge test.

Deliverable 2 sought to examine how to best assess the competencies of motorcycle riders within a licensing context and to review how this was currently being undertaken in Queensland in comparison with approaches taken elsewhere. The literature review found that competency-based training and assessment of motorcycle riders is uncommon in other jurisdictions and so few evaluations of its effectiveness are available. The content of the Q-Ride competencies was supported by the literature and expert opinion, although the potential to expand the competencies to better measure higher order skills such as hazard perception and attitudes to risk taking was identified. Further opportunities for refinement of Q-Ride and the CAP were identified: (1) improvement of collection and recording of data from Q-Ride training and assessment audits to better monitor and review the CAP process; (2) collection of measures of rider skill and proficiency which could be linked to CAP information to assess how well particular competencies are contributing to rider skill and proficiency; and (3) linking data collected as part of the CAP with crash information to undertake an outcome evaluation to determine which competencies are related to later crash involvement.

Deliverable 3 sought to identify approaches to motorcycle training and licensing interventions directed at risk taking or hazard perception and to provide recommendations on how these interventions may be incorporated into the existing licensing systems in Queensland (Q-SAFE and Q-Ride) at both the pre-learner and pre-licence phases. It concluded that the content of the hazard perception program should include recognising and predicting the behaviour of other road users, recognising road-based hazards and how to select and implement the most appropriate response. The content of the program for reducing risk taking behaviour should focus on factors underlying risk taking such as sensation seeking and self-monitoring, rather than focusing on the direct effects of factors such as alcohol,

speeding, and non-use of protective clothing. An integrated approach to addressing hazard perception and risk taking should be adopted where the emphasis is on intervening at multiple points in the riding history, rather than a single "inoculation" approach.

However, one of the constraints to drawing firm conclusions from the research was the lack of scientific evaluations of current motorcycle safety initiatives both in Australia and internationally. There is simply not strong enough evidence that particular programs or requirements are effective in reducing the occurrence or severity of motorcycle crashes. Most programs or initiatives that have been implemented have not been evaluated well or at all. Many experts and stakeholders hold views regarding what is effective, but there is little evidence available to assess these claims.

The lack of firm evidence on which to base programs is particularly challenging given the finding emerging from the research that programs (whether pre-learner or addressing hazard perception or risk taking) need to be implemented in a mandatory fashion in order to ensure that they reach all of their target audience. There does not appear to be the demand among riders and would-be riders for additional programs that would involve both time and monetary cost.

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