



MONASH University
Accident Research Centre

**REVIEW OF LITERATURE REGARDING NATIONAL
AND INTERNATIONAL YOUNG DRIVER TRAINING,
LICENSING AND REGULATORY SYSTEMS**

Report to Western Australia Road Safety Council
Commissioned by the WA Office of Road Safety

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Abstract:

As is common in developed countries worldwide, in Australia, including Western Australia (WA), young novice drivers are substantially over-represented in road crash and injury statistics compared to more experienced drivers. While young age can contribute to this inflated risk, the major contributing factor is inexperience. Measures that seek to address this inexperience include driver education and training programs and graduated driver licensing initiatives, which operate in the context of other regulatory systems, such as Police enforcement and laws regulating the purchase and consumption of alcohol. The WA Office of Road Safety commissioned the Monash University Accident Research Centre to review these systems, to determine current WA policies and practices and to make recommendations for the WA context. Published and unpublished literature were reviewed and a series of consultations undertaken with key agencies and individuals. The present document reports on the findings of these activities. Programs specified as a focus were the Road Aware Pre-Drivers initiative and the Youth Driver Development Program, in addition to the new Graduated Driver Training and Licensing system. Evaluations of all three initiatives have been commissioned and are currently in progress. Notwithstanding the need to monitor the findings of these evaluations and make revisions accordingly, a range of recommendations are made in each of the three key areas, that is, driver training, licensing and other young driver regulatory systems.

Key Words:

Young driver, driver licensing, driver education, enforcement, minimum drinking age

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Executive Summary

The young driver problem

As is common in developed countries worldwide, young drivers are among the most vulnerable road users in Australian jurisdictions, including Western Australia (WA), particularly during the first few months of unsupervised driving. While they represent only a minor proportion of licensed drivers, they are substantially more likely to be involved in fatal and injury crashes than experienced drivers. At least two out of every three fatalities of 17-20 year olds in WA occur as occupants of motor vehicles, primarily as drivers.

The high crash risk of young drivers reflects the effects of both youth and inexperience; however, inexperience is by far the main contributing factor. Crash rates have been shown to drop dramatically with increased driving mileage, and drivers delaying licensure to older ages have been found to have a similarly increased crash risk during the first 12 months of unsupervised driving. The great majority of crashes are attributable to under-developed cognitive-perceptual skills and over-estimation of ability coupled with underestimation of risk. Intentional risk-taking can also play a role, although is not considered to be a contributing factor in the majority of cases.

The present report

In order to address the over-representation of young drivers in WA fatal and serious injury crashes, the Road Safety Council and the Government of WA introduced the new Graduated Driver Training and Licensing (GDT&L) system in February 2002. The Road Aware Pre-Drivers program was also introduced in September 2002 to be offered across the state, and runs parallel to the Youth Driver Development Program (YDDP), which is being extended from its single location in Bunbury. The overriding objective of these programs is improved attitudes and safer road user behaviours. Evaluations of all three programs are currently underway.

Notwithstanding these initiatives, it is recognised that there is still the potential to revise current systems or to introduce new initiatives to enhance or complement the current GDT&L system based on 'best-practice' recommendations in the road safety literature. On this basis, the Office of Road Safety commissioned the Monash University Accident Research Centre to undertake a review of national and international literature on young driver training, licensing and regulatory systems and to make recommendations for the WA context.

This report details the findings of the review, with a focus on systems relevant to car-related driving (only) in the context of everyday driving. Included is an assessment of the current situation in WA, based on consultations with WA authorities and key individuals and the documentation and materials they provided. A number of recommendations are made for WA in light of the findings based on the road safety literature regarding 'best practice'.

Driver-training effectiveness

Overall, repeated reviews of the effectiveness of traditional vehicle-handling and control training programs have shown few benefits in terms of crash and injury reductions. In fact, in some cases such training has been counterproductive resulting in increases in traffic violations and crashes. More promising results have been found for training of higher-order skills, namely, attitudinal-motivational and cognitive-perceptual skills.

For Learner drivers, basic vehicle-handling skills training is important and effective in learning to operate a vehicle in traffic, in passing practical driving tests, and in minimising crashes during the Learner period. It does not, however, protect Learners from crash involvement once graduating to an unsupervised licence. Gaining many hours of varied experience is the key protective factor, with this experience better achieved during private practice than professional instruction. In contrast, licensing-based insight training has been linked to considerable crash reductions post-licensing. Evaluation of CD-ROM packages to train hazard perception and other cognitive-perceptual skills have also shown that Learners can be better trained in such skills without inflating confidence in driving ability.

For Provisional drivers, the insight-training approach has been effective in reducing crash involvement and has been shown to target misconceptions of driver ability and susceptibility to risk. Notably, no disbenefits have been found unlike the traditional skills-based programs. Hazard perception research has also found that novices can be trained to perceive hazards more quickly using video, small group discussion and in-car feedback methods. Overall however, the current most protective factor in reducing crash risk as a Provisional driver is many and varied hours of driving experience as a supervised Learner. Driver-training programs should primarily seek to supplement this experience.

Programs situated within graduated licensing systems allow longevity of training with staged increments in complexity as drivers progress from safer driving conditions to greater levels of risk. Programs that address higher-order skills according to 'best-practice' methodologies within this framework are most likely to be effective in reducing young driver road trauma.

Effectiveness of graduated licensing systems and components

The primary aim of graduated driver training systems (GDLS) is to reduce the inflated crash and injury risk of novice drivers by allowing driving only in lower-risk circumstances when first driving and gradually increasing exposure to higher-risk conditions based on increasing experience and maturity. While a relatively new feature of licensing, GDLS has been effective in achieving this aim, albeit to varying degrees.

Australian GDLS models vary greatly. While most have addressed the need for reduced BACs and differential penalty systems for driving offences, other requirements and restrictions are limited compared to systems in place in overseas jurisdictions.

Importantly, GDLS components do not necessarily affect risk on their own but as a function of the full GDLS model in place. While it can be difficult to determine exactly which combination of all potential requirements and restrictions is optimal, some components have been identified as particularly effective and are generally recommended. The following GDLS initiatives have clear associations to crash and injury reductions:

- Increasing the minimum duration of the Learner period (to promote increased on-road supervised driving experience).
- Introducing night-time driving restrictions for Provisional drivers.
- Introducing peer passenger restrictions for Provisional drivers.
- Mandating a zero BAC limit for both Learner and Provisional drivers.
- Mandating seat-belt use at all times for both Learner and Provisional drivers (in jurisdictions where this is not mandatory for all drivers).
- Removing age-based exemptions from GDLS restrictions.

There was theoretical support for the following GDLS initiatives and some research suggesting benefits, although the initiatives have not yet been fully evaluated:

- Mandating minimum supervised driving hours for Learner drivers with increased involvement by parents.
- Extending the Provisional licence period by increasing the minimum period or raising the minimum age for full licensure.
- Issuing warning letters, requiring a good driving record for progress to full licensure and lowering the demerit point threshold for Provisional drivers.
- Mandating display of *L*-plates and *P*-plates.
- Including attitudinal/motivational issues in graduated education, instruction and training programs (within GDLS models only).

The effectiveness of the following GDLS components is currently considered to be limited, inconclusive or unknown, but they have not resulted in counterproductive findings:

- Allowing a lengthy Learner permit tenure and no fees to renew permits to discourage early licensure, although this allows a longer period in which to gain supervised experience.
- Mandating supervisory driver requirements, including minimum age and driving experience, BAC limit and absence of recent licence disqualification or demerit point limit.
- Restricting Provisional drivers from driving high-powered vehicles.
- Increasing penalties for driving offences for Provisional drivers.
- Mandating towing restrictions for both Learner and Provisional drivers.
- Inclusion of graduated/multi-staged testing requirements, including knowledge tests, on-road practical tests and assessments, hazard perception tests, exit tests and retesting requirements.

Research on the effectiveness of mandating maximum speed restrictions for both Learner and Provisional drivers is also limited, however, some potentially counterproductive associations have been found.

Two GDLS initiatives were clearly found to be counterproductive, with links to increased crash risk:

- Education initiatives that encourage early licensure.
- Extensive professional instruction in the absence of sufficient private supervised driving experience.

In addition to these existing GDLS components, several initiatives not currently included in GDLS models were identified in the literature as offering potential new directions:

- Mobile phone restrictions (including hands-free use).
- Age and size of vehicle recommendations.
- Education and training methods from fleet initiatives, including peer group discussion and EcoDriving programs.

- Targeted initiatives for young driver recidivists, including education-based programs, alcohol and seat-belt interlocks and vehicle immobilisation or impoundment programs.
- Intelligent Transport Systems developments that can act as a training tool for young drivers, warn of high-risk conditions and, potentially, assist timely and accurate responses.

GDLS models generally receive acceptable levels of community support by both young drivers and parents/guardians; if not at the time of their introduction, a year or so later. Introducing new GDLS restrictions involves a trade-off between crash and injury reductions and the driving needs of young people. Notwithstanding the need for further research on the potential impact of new GDLS requirements in the WA context, particularly the likely benefits of night-time driving and peer passenger restrictions, the literature suggests that an appropriate balance can be achieved and is worth investigating.

Other young driver regulatory systems

Police enforcement, or indeed the perceived risk of detection and associated penalties for offences, can play a vital role in determining the extent to which a legislative initiative is effective. If there are few or no perceived consequences for non-compliance then compliance rates can be low. Conversely, if the chance of being detected and subsequent consequences are perceived to be high, compliance can increase.

Overtly dangerous or risky driving behaviours can attract Police attention for all drivers. Less obvious to detect are violations of licensing requirements or restrictions that apply to Learner and Provisional drivers but not fully-licensed drivers, which tend not to be targeted in Police enforcement programs. Beside young people themselves, parents are considered the main enforcers of GDLS regulations in the US, rather than the Police.

Non-compliance with GDLS regulations has been found to be common among young novice drivers; however, a US survey of those violating restrictions suggests they do so only rarely. In some cases this is with parental consent, although parents report that it is generally not difficult to enforce GDLS restrictions. Overall benefits of GDLS restrictions still occur even when the level of non-compliance is high.

Other regulatory systems pertaining to young people that interact with driving are those pertaining to alcohol purchase and consumption. These include the minimum legal drinking age, minimum age to purchase alcohol, service regulations for licensed premises and regulations regarding consumption and intoxication in public places. Such regulations impact on young people's opportunity to drive under the influence of alcohol, including underage and intoxicated drivers.

Initiatives to support these systems include those targeting vendors (e.g. compliance checks and apportioning responsibility for negative consequences), the young people themselves (e.g. penalties for false identification), as well as the broader community (e.g. education, controls on alcohol outlet locations, densities and hours of sale).

Main young driver issues in WA

A wide range of stakeholders were consulted about their views on current programs related to young driver safety and their suggestions for future improvements or initiatives. Several stakeholders expressed concerns regarding the Road Aware Pre-Drivers program and the YDDP. Some comments related to whether students may be participating in the programs when they are too young to put the learning into practice. A number of challenges for

evaluating these programs were noted, such as their voluntary nature and potential variability across locations.

Primary concerns with the GDT&L system are that the potential for an extended Learner period and increased driving experience are not being fulfilled, with a particular concern regarding the validity of logbook entries and the need to increase the minimum logbook hours to 120 hours (the amount that research shows leads to lower crash risks when first licensed). There is also doubt that a variety of driving experience is being achieved. Penalties for invalid logbook entries are not currently publicised.

Other concerns relate to limited regulations for supervisory drivers, particularly the lack of a BAC limit, and to whether mandatory professional instruction should be re-introduced. An increased validity period of Learner permits is needed and there is also potential for the Provisional period to be extended further.

Common concerns regarding the Provisional period are the lack of restrictions to address the increased risk associated with driving at night and with peer passengers, particularly multiple passengers. No vehicle power restrictions exist, although these are not yet supported by research. A reduced demerit point threshold has not been implemented.

While the BAC limit is lower for Learners and Provisional drivers, there is potential to reduce it further to a zero limit. There is no clear benefit of the Learner Phase 1 freeway restriction and some problems have been identified with the current HPT and with the ability to resit the test after a one-day lapse. There is no exit test to full licensure.

There is some indication that the community, especially young people, do not currently understand the aims of GDLS, including night-time and peer passenger restrictions, while some agencies also lack understanding of the new GDT&L system. There are concerns regarding the effects of the GDT&L system and potential additional restrictions on mobility and regarding equity issues for disadvantaged groups and remote communities. The need to increase vehicle insurance premiums has hampered the implementation of the Learner Driver Assistance Scheme. There is poor public transport or access to alternative transport in many locations. Limitations exist in available databases that reduce the ability to clearly assess and address relevant issues.

Police enforcement programs are hampered by a lack of mandatory carriage of licence regulations and vehicle owner onus for automatic speed infringements, their reduced on-road presence and their inability to access data regarding driver infringements/demerit points for roadside licence checks.

Recommendations for WA

Based on an examination of the literature in relation to the current situation in WA, a number of recommendations are made. Outcomes of the current evaluations of WA's GDT&L system, the Road Aware Pre-Drivers program and the Youth Driver Development Program should be monitored and implications for the following recommendations assessed. Likewise, any future research and developments should be monitored and evaluated and revisions made accordingly.

The primary aim of any driver-training program should be for participants to gain much and varied experience as a Learner. Programs should be linked into the compulsory licensing system and address higher-order attitudinal-motivational and cognitive-perceptual skills according to 'best-practice' methodologies as identified in the report. The role of

parents should be maximised, including improved guidelines for supervisory drivers. No developments in driver education, training or other initiatives should result in earlier licensure. Any changes should be monitored and their effectiveness evaluated, with revisions made accordingly.

The following changes to the Learner component of the GDT&L system are recommended:

- Mandating a minimum period of six months for the Learner Phase 2 permit.
- Increasing the Learner Phase 2 mandatory minimum driving hours to 120 hours, encouraging increased parental involvement.
- Mandating certain driving conditions in logbooks achievable by all new drivers (e.g. at night and with increased passengers), in addition to recommending that driving occur in a variety of conditions (e.g. wet weather, urban and rural settings), where this is possible.
- Revising logbooks to: emphasise the need to gain over a hundred hours rather than tens of hours of driving experience; more strongly encourage the logging of all driving hours; clearly detail restrictions, safety messages and penalties for misleading entries; and provide advice regarding supervisory drivers.
- Ensuring systems are in place that ensure applicants are aware of supporting resource materials available to them at each licensing phase/stage.
- Mandating a zero, or below 0.02% or 0.05% BAC limit for supervisory drivers, as found to be acceptable in the WA context, and exploring the possible introduction of a good driving record requirement.
- Reviewing and potentially revising current qualification processes for professional instructors based on content pertaining to hazard perception and road safety attitudes. There is currently no support for re-introducing compulsory professional instruction.
- Introducing a Learner permit that is valid for a longer period (e.g. 3-10 years).

The following changes to the Provisional component of the GDT&L system are recommended:

- Supporting further research and developments to introduce a two-phase Provisional period with a first phase of six months to include restrictions on driving at night and with peer passengers, with appropriate exemptions and penalties in place.
- Considering an increase in the Provisional period from two to three years, potentially initially with an exemption from displaying *P*-plates during the additional year (in conjunction with mandatory carriage of licence regulations).
- Prioritising the introduction of new licensing regulations with proven benefits, such as night-time and peer passenger restrictions, over the introduction of compulsory driver-training programs which have been found to be ineffective.
- Developing targeted education on the increased risk associated with driving at night and with peers and improving access to transport alternatives, such as night buses and other community buses.

Other GDT&L recommendations include:

- Maintaining current lack of vehicle power restrictions unless support for their effectiveness can be found.
- Retaining stricter penalties for offences, lowering the demerit point threshold for Provisional drivers, and supporting developments to introduce a system of warning letters; carefully considering potential effects on existing regulations.
- Retaining the exclusion of age-based exemptions from restrictions, such that GDT&L requirements and restrictions apply to all new drivers.
- Introducing a zero BAC limit for all Learner and Provisional phases (albeit with a higher Police tolerance).
- Reinforcing the importance of seat-belt use in reducing the risk of fatalities and injuries in the event of a crash in supporting GDT&L educational materials.
- Maintaining the lack of heavily-reduced maximum speed restrictions for Learner and Provisional drivers and supporting and monitoring research to determine whether the freeway restriction for Learner Phase 1 drivers should be revised.
- Maintaining the current lack of towing restrictions until support for their effectiveness can be determined.

Specific recommendations for revisions to driver testing include:

- Assessing the psychometric properties, validity and reliability of the current knowledge test and revising accordingly.
- Revising the current HPT in light of identified problems affecting its validity, reliability and practical value.
- Encouraging the use of the revised PDA where staffing allows. Supporting alternative licensing programs for remote communities to provide a means of obtaining a licence and reducing unlicensed driving and its legal and road safety consequences.
- Supporting further research and developments of exit tests and educational materials to mark the transition to a full licence and implementing those found to be effective.

Other recommendations include:

- If additional requirements or restrictions distinguishing the two Learner phases or a new system of two Provisional phases were introduced that required distinction for Police enforcement, display of different coloured *L* and/or *P*-plates should be mandated to distinguish the different phases (in addition to penalties for non-display).
- Supporting further research and developments regarding a mobile phone restriction prohibiting all use (including hands-free) for all Learner and Provisional phases.
- Ensuring age and size of vehicle recommendations are included in supporting guidelines/ educational materials.
- Supporting research and developments into targeted initiatives for young driver recidivists.
- Monitoring Intelligent Transport Systems developments pertaining to licensing and safety and support research and developments into their potential role in GDT&L, young driver education, training, guidelines and other supporting materials.

- Increasing public awareness, including road safety agencies and political parties, of the young driver problem and how licensing initiatives aim to address these; reinforcing that improved young driver safety has benefits for the whole community.
- Supporting initiatives to improve public transport availability and alternative transport options.
- Support developments to improve the quality of and access to relevant databases (e.g. crash, licensing and registration) to maximise their usefulness in enforcing, monitoring and evaluating GDT&L and other young driver safety initiatives.

Recommendations regarding other young driver regulatory systems include:

- Supporting initiatives to increase the perceived threat of detection and enforcement of GDT&L regulations.
- Supporting the introduction of mandatory carriage of licence regulations.
- Supporting improvements to Police database access to allow records of drivers' licence penalties to be accessed during roadside licence checks.
- Supporting the introduction of vehicle owner onus for automatic speed infringements.
- Supporting initiatives to increase Police on-road presence (in addition to automatic enforcement programs).
- Support initiatives to increase targeted Police enforcement of licensed premises where obvious drunkenness occurs, to increase the perceived threat of detection of illegal serving of alcohol within the industry and to change community acceptance of drunkenness through general education campaigns and a range of alcohol control strategies.

These recommendations are based on the current state of knowledge. Future research and developments should be monitored to assess whether any of the recommendations above should be changed.

Concluding comments

It must be recognised that, given the size of WA, range of weather conditions, terrains, road networks and community groups, including remote communities with reduced access to facilities and resources, no one system is likely to be perfect for all young people and communities across the state. Therefore, it is necessary to apply a system that will benefit the majority of people, with alternative programs or in some cases exemptions for specific individuals or community groups.

Enhancing current young driver regulatory systems in WA has the potential to work together with Arriving Safely, the WA Road Safety Strategy for 2003-07, to improve road safety outcomes for young drivers. The Strategy responses of Countering Drink Driving, Reducing Speeding, Increasing Restraint Use, Improving the Effectiveness of Enforcement, Improving the Safety of Roads, Protecting Vehicle Occupants and Reducing Travel Speeds will prevent or lessen the severity of crashes involving young drivers, providing benefits not only for young drivers but their passengers and other road users with which they interact.

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Chapter 1 Introduction

1.1 The young driver problem

As is common in developed countries worldwide, young drivers are among the most vulnerable road users in Australian jurisdictions, particularly during their first month but also during the first 6-12 months of unsupervised driving (Mayhew, Simpson & Pak, 2003a; McCartt, Shabanova & Leaf, 2003; Williams, 1999). While they represent only a minor proportion of licensed drivers, they are substantially more likely to be involved in fatal and injury crashes than experienced drivers. In Western Australia (WA) during 2000, 17-24 year-olds represented 42% of driver fatalities and 35% of all hospitalised drivers, even though this age group comprised only 14% of licence holders at that time. Drivers aged 17-20 years were 6.6 times more likely than drivers aged 40-49 years to be hospitalised or killed. Of crashes involving teenage drivers, the young driver is at fault more than 80% of the time, with young drivers' crash rates up to six times those of more experienced drivers (Ryan, Legge & Rosman, 1998).

Elliott (2000) reports that at least two out of every three fatalities of 17-20 year olds in WA occur as occupants of motor vehicles, primarily as drivers. In 2000, young people aged 17-20 years represented 37 fatalities (28 vehicle occupants, 2 motorcyclists and 7 pedestrians) and 325 hospital presentations (186 drivers, 112 passengers and 27 motorcyclists) as a result of road crashes (Road Safety Council, 2002a). Adams (2003a) estimates that young (17-18 year-old Provisional) drivers in WA are up to five times more likely to be involved in a crash¹ than drivers over 19 years of age, while Palamara, Legge and Stevenson (2002) found drivers in their first year of licensing had a crash rate² 3.5 and 2.6 times greater than drivers licensed for ten years and five years, respectively.

The high crash risk of young drivers is inflated by the effects of both youth and inexperience; however, inexperience is by far the main contributing factor (Drummond & Yeo, 1992; Maycock, Lockwood & Lester, 1991; Mayhew, Simpson & des Groseilliers, 1999). US surveys have shown that self-reported per-mile crash rates drop by almost half over the first 250 miles of driving and by almost two-thirds over the first 500 miles (McCartt et al, 2003). Recently, McKnight and McKnight (2003) demonstrated that the great majority of young driver crashes are attributable to inexperience: errors in attention, visual search, speed relative to conditions, hazard recognition and emergency manoeuvres. Very few crashes could be attributed to intentional risk-taking behaviours, such as excessive speeds. Moreover, drivers who delay licensure to older ages are still subject to increased crash risk when first licensed to drive unsupervised, with this risk decreasingly rapidly during the first 12 months (Mayhew et al, 1999; Maycock et al, 1991).

Stemming from this inexperience, young drivers tend to have insufficiently developed cognitive-perceptual skills and attitudinal-motivational orientations necessary for safe driving (Congdon & Cavallo 1999; Gregersen, 1996b; Gregersen & Bjurulf 1996; Katila, Keskinen & Hatakka, 1996; Keskinen, Hatakka, Katila & Laapotti, 1992; Mayhew & Simpson 2002; Siegrist, 1999). These higher-order, cognitive-perceptual skills include:

¹ based on crash rates per 10,000 licensed drivers

² per 1,000 person years

- information processing;
- hazard or risk perception;
- self-calibration (the ability to moderate task demands according to one's own performance capabilities);
- attentional control (the ability to prioritise attention);
- time sharing (the ability to share limited attention between multiple competing driving tasks); and
- situation awareness (internal representation of the current driving environment).

In addition, contrary to safety-focused, attitudinal-motivational orientations, young drivers are often over-confident, over-estimating their driving ability and the performance of their vehicle, in addition to underestimating risk.

Moreover, learning to drive generally commences during adolescence; a developmental stage characterised by increasing independence from parents and an increasing need for acceptance among peers (Senserrick, 2003). This developmental stage is associated with a range of health and safety-related risk-taking behaviours, including smoking, binge drinking, experimental drug use, poor eating habits, extreme sports and unsafe sexual practices. Within this context, young drivers are found to undertake more intentional or unintentional risks, such as driving at high speeds or speeds inappropriate for the conditions, closely following the vehicle in front (short headways), and driving aggressively (e.g. Gregersen & Bjurulf, 1996). They also tend to drive under conditions of greater risk - at night and with peers in recreational circumstances - more often than experienced drivers (e.g. Williams, 2003).

1.2 Background to the present project

To address the over-representation of young and novice drivers in WA fatal and serious injury crashes, the Road Safety Council and the Government of WA introduced the new Graduated Driver Training and Licensing (GDT&L) system, a partly-staged introduction from February 2001. The Road Aware program, including components for pre-drivers and their parents, was also introduced in September 2002 to be offered across the state, and runs parallel to the Youth Driver Development Program (YDDP), which is being extended from its single location in Bunbury. The overriding objective is that young people progressing through these programs will develop improved attitudes and safer road user behaviours.

The Road Safety Council has commissioned evaluations of the GDT&L system and the two driver-training programs and these evaluations are currently underway. Notwithstanding these initiatives, it is recognised that there is still the potential to revise current systems or to introduce new initiatives to enhance or complement the current GDT&L system.

On this basis, the Office of Road Safety commissioned the Monash University Accident Research Centre (MUARC) to undertake a review of national and international literature on young driver training, licensing and regulatory systems and to make recommendations for the WA context.

1.3 Aims and objectives

This report explores systems relative to young drivers within the context of graduated driver licensing, driver-training programs integrated and complementary to these systems, and other regulatory systems that impact on these, in particular, Police enforcement programs.

The focus of the review is on systems relevant to car-related driving (only) in the context of everyday driving (i.e. not for emergency or special vehicles, four wheel drives, trucks or other heavy vehicles). It does not cover riding training or licensing systems for motorcyclists, which can be found elsewhere (e.g. Christie, 2004; Haworth, Smith & Kowadlo, 2000).

The objective is to identify systems that could be considered to represent 'best practice' in order for the Office of Road Safety to critically review policy in relation to young driver training, licensing and regulatory systems.

To this end, the research aimed to:

- Summarise national and international literature on the effectiveness of particular models and/or characteristics or components of driver training, graduated driver licensing and regulatory systems in reducing crash fatalities and serious injuries of young and novice drivers and their passengers.
- Detail the types of driver training, the licensing system and regulatory systems in place in WA.
- Compare existing WA systems, their characteristics and components, with those identified in the literature as 'best practice'.
- Make recommendations in relation to WA's young driver training, licensing and regulatory systems to input future policy developments.

1.4 Project methodology

In accordance with the project brief, the project methodology comprised:

- An extensive search and review of national and international literature and documentation, including critical review of formal evaluations of existing young driver training, licensing and regulatory systems.
- Consultation with authorities and individuals as nominated by the Office of Road Safety relevant to and responsible for young driver training, licensing and regulatory systems in WA.
- Examination of internal and public documentation and materials provided by individuals and authorities who participated in the consultation process.

Of particular note, the information documented in this report in relation to current systems in place in WA was, therefore, primarily obtained through personal communication and documentation provided as a result of the consultations, in addition to information available from the agencies' web pages. For confidentiality reasons, this information is not referenced, other than that available in published literature, except where it is necessary to clarify the context of key comments.

The consultations were held during June and July 2004 and reflect policies, practices and opinions expressed at that time.

1.5 Structure of this report

The review of national and international literature is reported in the following three consecutive chapters, which examine the effectiveness of young driver training (Chapter 2), graduated driver licensing (Chapter 3) and other regulatory systems (Chapter 4). Where appropriate, the literature is addressed separately in relation to Learner¹ and Provisional² drivers.

Chapter 5 details the current systems in place in WA and addresses their likely benefits in light of the road safety literature. Chapter 6 states the recommendations for WA arising from this assessment, including implications for policy developments. The report concludes with some final closing comments.

¹ Throughout the report, the title case 'Learner' is used to refer to drivers holding a Learner permit, to distinguish the term from references to the 'learning period' which can be viewed as extending from the pre-Learner period through to full licensure.

² Throughout the report, the title case 'Provisional' is used in reference to drivers holding a Provisional licence. In various countries and jurisdictions this may also be known as a 'Probationary', 'Intermediate' or 'Restricted' licence.

Chapter 2 Young Driver Training Programs

2.1 Driver training approaches

2.1.1 What is driver training?

Often the terms ‘driver training’ and ‘driver education’ are used interchangeably to describe the same programs or activities. While there is conceivably some overlap between the two terms, each can be shown to represent distinguishable concepts.

Researchers such as Horneman (1993), Siegrist (1999) and Christie (2001) have defined driver training as referring to a specific instructional program or set of procedures that relates to car control or car ‘craft’. Clear examples are vehicle-handling skills programs that teach the driver to control a vehicle in traffic. Such programs focus on developing a specific set of skills. In contrast, driver education refers to the more contemplative and value-based instruction of knowledge and attitudes relating to safe driving behaviour. It generally covers a broader range of topics than training and is carried out over a longer period. Driver training, therefore, can be viewed as a specific component of the broader field of driver education.

In some cases, it may seem difficult to distinguish the two. Education programs may include an in-car component and training programs do not necessarily take place in isolation from driver education. For example, many advanced car control programs include classroom-based theory sessions. The distinction made in the present chapter is with respect to the focus of a given program: if the central objective of a program is to provide driver training, it is included here.

2.1.2 The traditional approach

The traditional approach to training young drivers has a focus on vehicle-handling and control skills, with most instruction taking place in-vehicle. At the beginning of the learning period, this can include steering and manoeuvring in low-speed conditions (e.g. parallel parking) and in higher-speed conditions (e.g. lane changes in heavy traffic and the overtaking of slower vehicles). This type of skills training is undertaken with the aim of passing a practical test for a driving licence and usually includes some teaching of road and traffic laws. As a novice, the focus is more on skills to control a vehicle in emergency situations. This can include controlled braking and emergency steering exercises to allow for sudden obstructions or to adjust to different road surfaces (such as wet or gravel surfaces).

Therefore, traditional driver training tends to concentrate on physical vehicle-related skills and lower-order cognitive skills, without attending to other higher-order skills (Herregods, Nowé, Bekiaris, Baten & Knoll, 2001). Motivational orientations behind driving are generally overlooked, making it less likely that optimal safe driving practices will be adopted regardless of the level of congruity between driving skills and task demands of the young driver (Peräaho, Keskinen, & Hatakka, 2003).

2.1.3 The insight training approach

The central objective of the insight training approach is to address poor, driving-related attitudes and motivational orientations associated with greater risk-taking behaviour, including overconfidence, overestimation of skills and underestimation of risk. Therefore, the focus is on development of higher-order skills required for safe driving rather than on physical skills relating to vehicle control. The term follows from the *Swedish Insight Program* lead by Gregersen (1996a, 1996b). Training from an insight approach involves raising awareness or improving insight into factors that contribute to road trauma. From this perspective, it can be argued that it is not the amount or level of skill a driver possesses that is important, but rather when and to what extent that skill is implemented to achieve and maintain safe driving (Dols, Pardo, Falkmer, Uneken & Verwey, 2001; Peräaho et al, 2003).

An often encountered difficulty when attempting to train higher-order skills is the ability to control the parallel or mirrored increase in overconfidence and overestimation of skills (Gregersen, 1996b). This can result due to incongruence between goals of the trainers and goals of the trainees (Katila, Keskinen, Hatakka, & Laapotti, 2004). For example, while the trainer's goals may be the ability to perceive hazards and respond appropriately in an emergency situation, the trainee's goals may be the mastery of technical vehicle-handling skills, leading to the assumption of greater ability and, therefore, greater confidence. Katila et al (2004) emphasise, however, that this does not have to be the case and is least likely when training is focussed on avoidance or anticipation of potential crash situations. To achieve this, Kuiken and Twisk (2001) stress the need for drivers to calibrate the myriad of task demands required by the fluidity of road situations and environments (higher cognitive processes) and driving skills (lower cognitive processes).

Publications over the past decade provide ample theoretical support for insight training as a crash reduction measure (Catchpole, Cairney, & Macdonald, 1994; Gregersen & Bjurulf, 1996; Hatakka, Keskinen, Gregersen, & Glad, 1999; Horneman, 1993; Lonero, 1999; Lynam, 1996; Mayhew & Simpson, 1996; McKenna & Crick, 1994; Peräaho et al, 2003; Twisk, 1995). Hatakka et al (1999) explains the importance of attitudinal-motivational skills in terms of a hierarchy of driver behaviour. While skills for vehicle manoeuvring and mastery of traffic situations are the basis for successful operation in traffic (and therefore should be learned well during training as a Learner), they are at the lowest levels of the hierarchy. At the higher levels are the goals and motives that guide these behaviours. Hatakka et al propose that modification of behaviour, therefore, is not possible without modification, or at least awareness, of these higher-order factors. In this way, driver training should promote the view of driver behaviour as a multi-level task. This hierarchical view of driving behaviour, while having its origins in Finnish research, is now widely acknowledged throughout Europe as being a useful starting point for driver education; widely known as the EU GADGET matrix (Peräaho et al, 2003).

2.1.4 The cognitive-perceptual skills approach

As noted earlier, a range of higher-order cognitive-perceptual skills have been identified as important for safe driving, including information processing, hazard perception situational awareness, attentional control, time sharing and self-calibration. The most widely researched of these skills in relation to driving training, and perhaps the most promising, is hazard perception (Elander, West & French, 1993).

Hazard perception is the ability to perceive and identify specific hazards in the driving environment (McKenna & Crick, 1994). It is a complex task that involves scanning the road environment, evaluating other drivers' location in the traffic environment, and predicting objects and other drivers' behaviour (Ferguson, 2003). Hazard perception is estimated to potentially take decades to develop to an optimal level (Evans, 1991). A large, well-controlled study of the relationship between hazard perception ability and crash frequency found that crash rates doubled between the 5th and 95th percentile of hazard perception scores (Quimby, Maycock, Carter, Dixon, & Wall, 1986). Moreover, this relationship between slower detection of hazards and higher crash rates remained when controlling for age and distance travelled (i.e. driving exposure).

Reaction time to detect hazards has been found to vary with experience, such that experienced drivers are found to be faster at detecting hazards than inexperienced drivers (McKenna & Crick, 1994). An early investigation of the visual search patterns of novice and experienced drivers found that while both groups similarly identified near hazards, novices did not search as far into the distance as experienced drivers and therefore were considerably poorer at detecting distant hazards (Mourant & Rockwell, 1972). A study by Whelan, Groeger, Senserrick and Triggs (2002) supplemented these findings, showing novice drivers also tended to focus their attention on near hazards, in particular those in adjoining lanes. Subsequently, they were significantly poorer than experienced drivers at detecting hazards in the driver's lane.

Studies such as these provide rich support for the notion that novices scan the driving environment in different ways to experienced drivers. Extrapolating these findings in relation with crash statistics, the research indicates that differences in hazard perception are mediated by driving experience, such that greater experience is associated with more effective hazard perception skills in terms of crash avoidance. A driver's mental model, then, is expected to change with driving experience (McKenna & Crick, 1994).

The cognitive-perceptual skills approach can be also viewed as concerned with the individual's processing of information from a social perspective and the influences and constraints placed on that information processing in relation to driving behaviour (Groeger, 2002). To achieve calibration between task demands and driving skills while avoiding overconfidence and overestimation of skills, this training must also take into account motivational orientations in addition to the aptitude of the driver (Hatakka, Keskinen, Gregersen, Glad, & Hernetkoski, 2002; Peräaho et al, 2003).

2.2 Effectiveness of Learner driver-training programs

2.2.1 Passing the licence test

The most basic driver training is the instruction received by Learners when they first undertake to drive a vehicle; that is, training of basic vehicle-handling skills that allow them to operate a vehicle in traffic. As most drivers who undergo training as a Learner eventually proceed to full licence, this initial instruction can be viewed as successful in terms of allowing an individual to drive. For example, around 85-90% of Australian adults have a driver licence (Christie, 2001).

Professional versus lay instruction

In Australia, instruction for Learner drivers can either be by a qualified professional driving instructor or by any licensed driver who meets minimum requirements legislated at a state level, such as a minimum licence-holding period. For example, in WA, a lay supervisory driver must have held a licence in that class for a minimum of four years, whereas in Queensland the supervisory driver must only have held a Provisional licence for 12 months. Therefore, training undergone as a Learner driver can be under the direction of parents, family and friends, and/or professional driving instructors. This contrasts to some European countries that only allow instruction by qualified professionals (e.g. Denmark, Germany and The Netherlands; Gregersen, Nyberg & Berg, 2003). This has resulted in a number of studies that compare the relative benefits of professional versus private instruction.

Early research in the United Kingdom (UK) found that Learners who had gained some private driving experience in addition to a moderate number of professional lessons were more likely to pass their driving test, while those who had undertaken a substantial number of professional lessons were less likely to pass the test (Forsyth, 1992). While these findings might be interpreted as suggesting that there is a threshold beyond which professional instruction becomes counterproductive, they might also indicate that instructors correctly spend more time with drivers whose skills are less developed or who are slower to learn (Groeger, 2001; Hall & West, 1996). Notably, however, the latter explanation could indicate that the additional professional training was not effective. These findings have also been replicated in the UK more recently in a study that controlled for several other factors, such as academic grades, IQ and personality variables, therefore supporting the former explanation (Groeger, 2000; Groeger & Brady, in press). Groeger's research showed that the type of experience gained under private instruction was more varied in terms of length, time of day, road types and driving speeds than that with professional instructors. In particular, substantially more practice was gained in darkness. This further supports Forsyth's (1992) findings that the optimal combination of instruction is a moderate number of professional lessons in addition to the valuable driving experience gained under private instruction.

2.2.2 Reducing crash involvement during the Learner period

It is common in jurisdictions worldwide for Learner drivers to have the lowest level of crash risk of any driver group. Early UK research estimated that crash risk in the first year of Provisional driving was at least 20 times higher than during the supervised Learner period (Forsyth, Maycock, & Sexton, 1995). Current Swedish research estimates this figure to be even higher at 33 times greater risk of an injury crash (Gregersen et al, 2003).

Notably, when investigating this issue, Gregersen et al (2003) found there were differences in crash involvement for Learners (of all ages) undertaking private versus professional instruction. During 1994-2000, there were fewer crashes during professional instruction (14%) compared to private instruction (86%). Of crashes resulting in fatalities, none occurred during a professional session. Learners under private instruction were involved in 16 such crashes resulting in 22 fatalities. The authors attributed this finding to several factors, including the use of dual control systems by professional instructors and the differing types of driving exposure experienced under the two methods.

2.2.3 Reducing crash involvement post-licensing

Several programs have been developed for Learner drivers with the aim of reducing the high crash risk they face once graduating to a Provisional licence. While these programs are addressed in the present section, it is important to emphasise that it is the on-road supervised driving experience undertaken as a Learner, and the variety of that experience, that is the most protective factor against subsequent crash risk (e.g. Mayhew & Simpson, 1996; Gregersen, 1996b). Training programs introduced at the Learner stage should only be viewed to be supplementary to extensive and varied driving practice under supervision.

Traditional programs

Beyond the instruction of basic vehicle-handling skills and driving practice received under supervision, several voluntary and mandatory programs exist that include training components for Learner drivers. An assumption of these programs is that they will help provide the education and training necessary to reduce the crash risk of participants when they graduate to a Provisional licence.

Most such training, including some in-car and simulator-based components, occurs within broader education programs conducted through the secondary school system (e.g. in Australia, the US, Canada and New Zealand). These are, in accord with Section 2.1.1, not described in detail here; suffice to say that several reviews of international literature have repeatedly found that there is no clear evidence that in-school driver education programs that include training components reduce the crash risks of their participants post-licensing (Christie & Harrison, 2003; Mayhew & Simpson, 1996; Struckman-Johnson, Lund, Williams, & Osborne, 1989; Vernick, Li, Ogaitis, MacKenzie, Baker, & Gielen, 1999; Woolley, 2000).

A recent meta-analytic review of post-licence education found 24 studies fitting the following selection criteria; randomised controlled trials which compare either post-licence education versus no education, or, one form of post-licence education versus a different form of education (Ker, Roberts, Collier, Renton, Bunn, 2003). There was no statistical difference to indicate that one form of education was more effective than another. There was also no difference between advanced education and remedial education. The authors argued that there was no evidence that driver education is effective in preventing road crashes.

Other such training that occurs during the Learner period is that associated with graduated driver licensing systems, such as the programs evaluated in Norway, Finland and Denmark. In Norway, when mandatory training prior to licensing that included skid control and car control on icy roads was introduced, novice driver crashes on slippery roads actually increased (Glad, 1988; cited in Keskinen et al, 1992). Similar results were found in Finland (Keskinen et al, 1992). Katila et al (1996) explained that, while the manoeuvring skills taught were intended to be included in emergency circumstances only, it appears that the training increased the confidence of the young drivers and as a result, they tended not to avoid difficult conditions or to take on more demanding tasks, including driving at higher speeds.

One positive finding emerging from the research was in relation to driving at night or in dark lighting. The Norwegian research (Glad, 1998, cited in Mayhew, Simpson, Williams, & Ferguson, 1998b) demonstrated that it was possible to reduce crash rates amongst drivers during night-time hours by conducting training programs in dark daylight or night-time

hours. This study not only found a significantly lower crash rate for night-time driving amongst males, but that the effect was evident at a two-year follow-up.

Insight-training programs

The above programs were among the early training programs introduced for Learner drivers. Since then, the new insight training approach has been applied in both pre and post-licence training.

A 2002 article by Carstensen reports on Denmark's mandatory training program for Learners. As noted earlier, Denmark does not allow private instruction and, therefore, all Learners are subject to the same training program provided by accredited instructors. The program incorporates both theory and practical sessions with a focus on gradually improving manoeuvring and other vehicle-handling skills, commencing with off-road training at low speeds to on-road training in calm traffic to on-road training in heavy traffic, including driving on high speed roads and at night. Rather than adopting a traditional approach, however, the emphasis is on defensive driving and the perception of hazards. Stated aims include raising awareness of the possible dangers in traffic, how to perceive these dangers, and how to react appropriately. These new subjects were also included in the theoretical and practical driving test. The minimum licensing age is 18 years and the training can commence up to three-months prior to this.

Carstensen (2002) evaluated the effectiveness of the program by comparing longitudinal survey data of young people (on four occasions over 5.5 years, including distance travelled data) and Police-reported injury crashes of 18-19 and 24-54 year olds (six years prior and six years following the program changes). Significant crash reductions were found, including multiple-vehicle and low-speed manoeuvring crashes, but not single-vehicle crashes. The reductions were more marked than those attributable to general crash trends, changes in the driving population and improved weather conditions, notwithstanding an increase in distance travelled estimates. Carstensen concluded that at least a 15% reduction in injury crashes was attributable to the program over a six-year period.

Hazard perception training

Two CD-ROM training products targeting novice drivers have been developed to train higher-order cognitive skills, namely DriveSmart (Regan, Triggs & Godley, 2000) and Driver ZED (Fisher, Laurie, Glaser, Connerney, Pollatsek, Duffy, & Brock, 2002). Both include training modules on hazard perceptual skills and both have been evaluated by means of driving simulators as a pseudo-observational method. Neither has yet been evaluated on-road, but the findings provide emerging support that hazard perception skills known to be important in safe driving can be trained.

DriveSmart

The DriveSmart CD-ROM was developed for Victoria's Transport Accident Commission (TAC)¹ to train Learners in four skills identified as critical in moderating the crash

¹ The TAC currently distributes DriveSmart to Victorian Learner drivers together with other materials as part of its HELP Campaign.

involvement of novice drivers (Triggs, 1994; Triggs & Stanway, 1995). These are hazard perception, attentional control, time sharing and calibration.

In addition to optimism, commentary driving, prediction and situation awareness literature, the insight-training literature was examined when devising the content of DriveSmart, in conjunction with simulator-based experimental research. The effectiveness of DriveSmart as a training product was tested using an advanced moving-platform driving simulator (Regan, Godley & Triggs, 2000). Performance of trained young drivers was compared to that of a control group, with all participants aged between 17 years and 17 years 9 months. Participants were tested immediately after training and four weeks post-training.

The results showed trained novices performed significantly better than controls on many of the simulator tasks both immediately after testing and four weeks later. In particular, the researchers concluded that trained participants exhibited superior hazard perception skills and attentional control skills than the control participants. In addition, a sub-task was completed prior to training and at the end of the evaluation to assess driver confidence. Importantly, it was found that there were no differences in the confidence ratings of the trained participants and controls either before or after training. This suggested that the DriveSmart training did not induce overconfidence in driving ability associated with increased crash risk for other training programs.

Since the evaluation of DriveSmart, a revised version has been developed with the aim of further increasing its effectiveness.

Driver ZED

The Driver ZED CD-ROM was developed for the AAA Foundation for Traffic Safety in the US and evaluated by Fisher et al (2002). The product, which focuses on hazard perception skills (only), is based on commentary driving techniques that aim to teach the student how to scan the driving environment for potential hazards by breaking it into a number of zones. Students are trained to articulate what they are doing while driving and are then evaluated on the commentary they provide.

An evaluation of the program was undertaken using a fixed platform driving simulator. The performance of trained 16-17 year-old high school students who were learning to drive was compared at 1-2 weeks post-training with that of fully-licensed college students who spent a high number of hours (10-20 per week) driving a college bus. While the results were somewhat mixed, trained participants were found to drive more similarly to experienced drivers after the training in ways that were likely to reduce their exposure to risk. The researchers concluded that the program had the potential to reduce novice driver crashes and have planned a more long-term evaluation at six months post-training.

2.3 Effectiveness of driver-training programs for Provisional drivers

As noted earlier, while Learners have the lowest level of crash and injury risk of any driver group, Provisional drivers are among those most at risk, particularly during the first months of unsupervised driving. Graphical representation of the relationship between driver age and crash fatality rates depicts a U-shaped curve, with the highest rates for both younger (<25 years of age) and older (>70 years of age) drivers (Dols et al, 2001). Crash rates during the first six months of Provisional licence are higher than when on an full licence (e.g.

American Academy of Pediatrics, 1996). Moreover, this very high initial crash involvement decreases rapidly during the first 6-8 months of driving and continues to decrease for the first 12 months (e.g. see review by Engström, Gregersen, Hernetkoski, Keskinen & Nyberg, 2003). A recent study by McCartt et al (2003) found that, per one hundred drivers, 5.9 crashes occurred within the first month of licensure, 3.4 crashes during the second month, with crashes decreasing at a variable rate from 3.0 to 1.3 for the subsequent 10 months. Mayhew et al (2003a) also report a disproportionately high level of crash rates in the first few months following licensing, with a dramatic drop after this period. Therefore, several driver-training programs have been developed for the early stages of the Provisional period with the aim of reducing this risk.

2.3.1 Traditional programs

As noted by Christie (2001), there are few training programs developed solely for Provisional drivers, although in Australia, many novices seek out traditional defensive or advanced driving courses that are offered to the general public or are encouraged to do so by their parents/guardians. Often the majority of participants in such courses are fleet drivers who have been sent by their employers (Lough, Senserrick, & Johnston, 2002), so there is no specific focus on the novices' recent graduation to unsupervised driving.

Early Australian research in the 1970s in Melbourne and Sydney showed traffic violation records of trained novices increased following course attendance, while a 1980 study in Adelaide and a 1984 study in Queensland found no differences in novices' crash involvement pre and post-training (Christie, 2002). Recent reviews of novice participation in such training programs have found no crash or injury reduction effects of the training (Christie; 2002; Christie & Harrison, 2003).

Moreover, as found for Learner drivers (Section 2.2.3), without addressing higher-order skills, these programs have the potential to be counterproductive for young drivers, due to a false increase in confidence in their ability and, while underestimating their exposure to risk (e.g. Christie, 2001; Mayhew & Simpson, 2002; Woolley, 2000).

2.3.2 Insight-training programs

While there is general agreement in the academic community that research has clearly established that traditional skills-focused training is counterproductive for novices, there is still some uncertainty about whether insight training is effective in reducing crash involvement. At minimum, research has not found a counterproductive effect, as is true of traditional programs. Emerging research, however, is providing stronger support for theoretical assertions that the insight approach offers the most promise in developing effective training programs for the at-risk novice driver.

An early evaluation of insight training with novice drivers was reported by Gregersen (1996b). The study contrasted two groups. Both were briefed on basic theory of driving on icy roads, and on braking and avoidance manoeuvring. However, in addition, one group received skid training on a closed driving practice area – the 'skill group'. The other group drove on the same circuit but did not receive any skill guidance in order to demonstrate that even if they knew the basic theory, they could not rely on this in a critical situation – the 'insight group'. Surveys and course participation one week after training showed that the skill group estimated their skills to be at a higher level than the insight group, even though they did not differ on actual skills. These findings suggested insight-trained drivers were less

likely to report overconfidence in their driving ability; a positive attitudinal change, although the study did not include a control group.

A later (1999) study of the full *Swedish Insight Program* for novice drivers was conducted by Nyberg and Engström (1999). They also reported some positive attitudinal outcomes of the program (mostly in relation to seat-belt use); however, they failed to find differences among test and control groups in attitudes relating to vehicle following distances, and speed and road conditions. The researchers concluded that the program showed potential; however, modifications were still needed to enhance safety outcomes.

In line with the Swedish research, a compulsory driver-training program, undertaken from an insight approach, was introduced in Finland as part of their licensing system. The program takes place from between six months to two years post-licensing. This is equivalent to WA's Provisional period, although, while stricter penalties apply, there are no additional restrictions associated with the licence. A crash-based evaluation of the program examined self-reported crash and exposure surveys of 30,000 drivers, on claims data from all Finnish insurance companies, and on longitudinal self-evaluation surveys of over one thousand drivers (immediately following licensing, ½-1 year later, and 547 drivers 4-5 years later) (Keskinen, Hatakka, Katila, Laapotti & Peräaho, 1999).

While Keskinen et al (1999) found little evidence of an effect during the first year following the program, differences were reported in the long term. For the four-year period following introduction of the program, they found a 25% decrease in crashes in slippery road conditions for 18-20 year-old males and a 50% decrease for males aged over 20 years. An 18% decrease was found for 18-20 year-old females. There was no significant change for females aged over 20 years. Similar percentage decreases were reported for crashes in the dark. The extent to which the reductions could be attributed to the new training program was complicated by the finding that there was a downward trend in crashes in Finland in general during the analysis period. However, crash reductions in the 2-4 years following the program were more marked than for the general crash trend. Therefore, the researchers concluded that the program contributed to crash reductions.

A recently released follow-up to the Swedish research, undertaken with older male drivers (in their twenties), has again found positive tendencies but no significant overall effect of insight training, although skill-based training was again shown to be counterproductive (Nolén & Nyberg, 2001). Notably, however, these general interpretations are based on an English abstract (only) of a Swedish report. Recent discussions with the first author (Nolén, 2003), confirm that the findings still strongly support various aspects of the *Swedish Insight Program* but highlight areas that need to be developed further. It is noteworthy that, following local research findings on the insight versus skills-based approach, Sweden revised its compulsory skid training program in their national licensing system to be conducted from an insight approach, as per Gregersen's (1996b) study (Berg, 2003).

Some Australian research has also shown support for the insight approach (Senserrick & Swinburne, 2001). The research evaluated a driver-training program developed for 18-25 year-old recently-licensed Provisional drivers based on insight principles. It includes both classroom theory and off-road practical sessions conducted over a one-day period. A survey of participants and controls pre and post-training and a 10-12 week follow-up, found positive shifts in attitudes and self-reported behaviour, particularly for young males.

2.3.3 Hazard perception programs

Research in the UK compared three methods of hazard perception skills training for novices, who had been licensed up to a maximum of three months, and evaluated the programs for subsequent improvements in safety and general driving skills (Mills, Hall, McDonald & Rolls, 1998). The methods comprised:

- Classroom-based training: a one-off, two-hour session that involved watching a video depicting hazards and small group discussions led by a professional driving instructor.
- On-road training: two one-on-one driving sessions over two weeks with a professional instructor, including a feedback period at the end of each session that identified the skills to be practiced.
- A combination of the classroom-based training and on-road training.

Mills et al (1998) found that the combined method of both classroom and on-road training yielded the most significant reduction in average hazard perception times post-training during both video-based and on-road assessment tasks. On-road training also showed significant improvements on the video assessment task and, for some participants the on-road assessment task, but not to the extent found for the combined training group. No significant improvements were found for the classroom-based training only group (in comparison to a control group). The authors concluded that the results demonstrated the ability to improve the hazard perception skills of novices, which can provide an important road safety countermeasure.

More recent research in Norway has also found positive outcomes of risk perception training for novices via a large multimedia campaign run in two Norwegian counties (Rundmo & Iversen, 2004). Unfortunately, the publication on the evaluation does not include sufficient details to describe the type of training administered. The content of the campaign is listed as:

- Two multimedia productions on traffic safety (content mainly focused on emotional reactions to traffic accidents);
- School visits: Campaign teams visited high schools... to talk personally to every adolescent about traffic hazards and traffic safety;
- Training program about traffic safety to be applied by high school [sic];
- Extensive Police surveillance;
- Posters, movie commercials as well as competitions on traffic safety knowledge (aimed at reaching sensation seekers, “normless”¹ adolescents and those who were indifferent with regard to traffic safety).

The risk perception training was, therefore, conducted in the context of a broad campaign that involved the entire county communities rather than just the novices. It is unclear whether the campaign included any specific in-car training (e.g. in the high school program) or whether, for example, the multimedia productions included CD-ROM training exercises.

A pre and post-campaign questionnaire evaluation (with independent samples, rather than a repeated-measures design) was conducted with novices aged 18-24 years¹. Rundmo and

¹ Defined as “a state where social norms no longer regulate behaviour”.

Iversen (2004) found that the post-campaign group reported less risk-taking behaviour in traffic, and a 13% reduction in speed-related crashes. Rundmo and Iversen suggested that the limited success, if any, of previous risk perception campaigns was due to a focus on emotional attitudes to traffic safety in general rather than cognitive and attitudinal aspects relating to risk perception.

Other relevant research on training to improve hazard perception skills and other cognitive-perceptual skills associated with driving, such as situation awareness, can be found in aviation literature. A recent review of advances in behavioural research identified several aviation studies that can offer insights for developments in driver training (Lenné, Regan, Triggs & Haworth, 2004). For example, comparisons of various training methods on flight simulation tasks have shown that variable reliability of equipment in detection tasks and variable priorities in attention tasks have positive effects on detection rates and time-sharing abilities, respectively. In addition, aspects of Crew Resource Management (CRM) training to improve teamwork in the cockpit were identified for potential applications to safer driving with passengers. It was suggested that the CRM assertiveness tool, for example, could be used to empower passengers to ‘speak up’ such that, rather than using a single ‘blunt’ statement to bring safety concerns to the attention of the driver, a hierarchy of verbal statements could be used (e.g. to address concerns about speeding behaviour).

2.4 Other methodological considerations

Most driver-training programs and many of those reviewed here tend to be one-day or half-day programs, which are unlikely to be associated with crash reductions for several reasons (Christie, 2001, 2002; Goldenbeld & Hatakka, 1999; Jonsson, Sundström & Henriksson, 2003; Woolley, 2000):

- Inexperience is potentially the greatest contributor to crash risk. Therefore, substantial on-road driving experience is a major protective factor that cannot be substituted by short-term training.
- Risky behaviours and crashes are not necessarily associated with lack of knowledge or inadequate vehicle-handling skills.
- Established behavioural patterns are difficult to modify, particularly when not practised or performed regularly (such as skills for use in emergency situations).
- Evaluations often do not account for distance travelled, other exposure measures or motivation levels of target groups and evaluation outcomes have not always matched the objectives of the training.
- Crashes are relatively rare events. Therefore, their use as an effectiveness measure is unlikely to distinguish differences in small samples or short study timeframes.
- In many jurisdictions, the official crash-reporting criterion involves injury requiring medical treatment. This grossly underestimates crashes of lower levels of severity, the very type of crashes where training may be expected to have its greatest impact.

As Leutner and Bruenken (2002) recognised, while theoretical knowledge is relatively simple and quick to learn, competence in physical actions and attitudes involves a long-term learning process. Lonero (1999), in arguing the case for longer-term, staged approaches to

¹ Eighteen years is the minimum age for licensure allowing unsupervised driving.

driver training, has also highlighted the limited capability of novice drivers to absorb and recall large amounts of information and training over a short time period.

Importantly, many of the insight-training programs in the present review that reported crash reductions were incorporated into national multistage or graduated driver licensing systems. Typically, the impact of the training program cannot be isolated from the graduated system itself. It is possible that the link to a (compulsory) licensing system is the key factor. However, it is also noteworthy that, while the licensing systems were graduated according to driving experience, there were no corresponding additional licence restrictions during transitional stages (unlike Australian Provisional drivers, for example). Most evaluations of graduated driver licensing systems attribute crash reductions to these added restrictions on driving (e.g. BAC limits, night-time driving restrictions and passenger restrictions) (see Senserrick & Whelan, 2003).

There are several implications for the duration and timing of training if included in a graduated licensing system. Training can occur on more than one occasion allowing opportunities for repeated and extended learning over lengthy time periods in line with increasing experience. Moreover, a graduated licensing system allows appropriate assessments to be integrated with training, allowing individual differences to be identified and addressed (see Mayhew & Simpson, 1995).

It is generally recognised that a “single-shot” program is unlikely to be able to cover all facets of driving effectively and, therefore, it has been recommended that such training sessions be limited to a number of specific aspects (Christie, 2001). A training session that is too ambitious may risk less effective training of a wide range of skills rather than effective training of a few key skills. A longer-term program, however, is not limited in this manner.

It has been argued that effective training needs to encompass a comprehensive range of driving scenarios and to be taught in a self-paced way, with the provision of appropriate feedback and knowledge testing (e.g. Jonsson et al, 2003). Effectiveness can also be improved through implementation of more stringent topic inclusion criteria relative to young-driver deficient areas, such as cognitive-perceptual skills and attitudinal-motivational orientations (Mayhew & Simpson, 2002). Driver training programs that are developed to occur at successive stages of a graduated driver licensing system and that increase in complexity according to the individual driver’s level of skill and experience, and according to the conditions of the licensing stage they precede (Lynam, 1996), allow such principles to be followed.

A recent literature review by Engström et al (2003) highlights that there is much disagreement, not only regarding the usefulness of driver training, but for those in support, regarding what topics should be covered and which methods should be used. Several common recommendations and conclusions regarding training methods can be summarised as such:

- Many hours of private supervised practice is an important protective factor against crashes as a novice, although this practice often lacks the structure required to maximise its effect. Many and varied practice conditions should be stipulated and supporting educational materials developed for supervisory drivers.
- Personal understanding and self-evaluation is essential but not automatic and must be included in training programs that demand active participation, consider personal experiences and allow for reflection.

- Programs should address issues of responsibility, perception, decision making and young people's general risk-taking and risk-acceptance tendencies.
- Consideration of the interplay between emotions, attitudes, goals and motives, should be standard procedure in young driver education and training programs.
- Programs should include small group, peer discussions, particularly to address peer norms, personal lifestyles/life situations, values and other life goals.
- Programs should be self-paced, extend over a long period of time and cover a comprehensive range of driving situations.
- Driver training methods that not only identify risk but also allow young drivers to actually experience risk, associated emotions and personal shortcomings are more effective.
- Driver training methods that are likely to be effective include practical exercises (at off-road facilities) and use of equipment integrated with theory sessions to demonstrate stopping distances and adequate headways, including in low friction conditions.
- Development of professional training programs combined with structured supervised practice has much potential to reduce crash involvement, both during the supervised Learner stage and first years of unsupervised driving.
- To be most effective, programs should be incorporated into a graduated driver licensing system and the role of parents maximised.

2.5 Summary regarding driver training effectiveness

Repeated reviews of the effectiveness of traditional vehicle-handling and control training programs show few benefits for either Learner or Provisional drivers in terms of crash and injury reductions. In fact in some cases, training can be counterproductive resulting in inflated confidence and risk-taking, such that traffic violations and crash involvement increase. More promising results have been found for training of higher-order skills, namely, attitudinal-motivational and cognitive-perceptual skills.

For Learner drivers, basic vehicle-handling skills training is important and effective in learning to operate a vehicle in traffic, in passing practical driving tests, and in preventing crashes during the Learner period. The experience gained during this period has been shown to differ under private and professional instruction, with private experience resulting in exposure to longer driving session in more varied driving conditions and, therefore, potentially greater crash risk while practising. Training of car control skills does not, however, protect Learners from crash involvement once they have graduated to a licence that allows unsupervised driving. In contrast, a study of insight-based training as part of the licensing system showed substantial crash reductions post-licensing. Evaluation of CD-ROM packages to train hazard perception and other higher-order cognitive-perceptual skills have also showed promising results; namely, that Learners can be better trained in such skills, which are known to play a large role in young driver crashes, without inflating confidence in driving ability.

For Provisional drivers, the insight-training approach has been effective in reducing crash involvement and has been shown to target misconceptions of driver ability and susceptibility to risk. Notably, no disbenefits have been found in relation to insight training programs, unlike the skills-based programs, which have been associated with increased novice driver crashes and traffic violations in some studies. Hazard perception research has also found that novices can be trained to perceive hazards more quickly using video, small group discussion and in-car feedback methods.

Overall, the most protective factor in reducing crash risk as a Provisional driver is many and varied hours of driving experience as a supervised Learner. Driver-training programs should primarily seek to supplement this experience. Programs that are situated within a graduated licensing system allow longevity of training with staged increments in complexity as drivers progress from safer driving conditions to greater levels of risk. Programs that address higher-order skills according to 'best-practice' methodologies within this framework are most likely to be effective in reducing young driver road trauma.

Chapter 3 Graduated Driver Licensing Systems

Licensing jurisdictions have become increasingly aware that traditional methods to address the young driver problem, such as standard driver education and training programs, have been largely unsuccessful. An alternative is to introduce a range of requirements and restrictions on drivers in sequential stages as they learn to drive, that is, to mandate a graduated driver licensing system (GDLS).

The aim of GDLS is to reduce young driver crash and injury risk by limiting their driving to safer, lower-risk conditions and progressively lifting restrictions as experience is gained. Basic forms of GDLS were introduced as early as the 1960s and 1970s; however, the more sophisticated systems that currently exist were largely implemented during the 1990s.

3.1 What is a graduated driver licensing system?

Graduated driver licensing systems (GDLS) refer to systems that require the individual to progress through a number of successive stages of licensing, each with requirements and restrictions particular to that stage, before progressing to a full licence.

The primary aim of GDLS is to reduce young driver fatalities and serious injuries. Specific objectives include (NHTSA, 1998):

- Expanding and lengthening the learning process to maximise driving experience and maturity of the driver before an unrestricted licence is issued.
- Reducing exposure to risk by requiring novices to build up important experience in low risk situations (e.g. under supervision and at low BAC limits).
- Improving driver proficiency by encouraging practice and by having multi-level testing, requiring well-developed basic skills before moving on to more advanced skills, and by delaying retesting after failures.
- Providing greater motivation for safe driving by rewarding good driving (progressively lifting restrictions) and imposing penalties for violations.

3.2 'Best-practice' GDLS models

A paper written by American Patricia Waller in 1970 (cited in Waller, 2003) first proposed a licensing system that included the following steps:

- Step 1: Daytime driving (only) with a parent.
- Step 2: Daytime and night-time driving with a parent.
- Step 3: Daytime solo driving; night-time with a parent.
- Step 4: Daytime and night-time solo driving.

It was also proposed that classroom training precede Step 1, and that driving skills be evaluated before entry into Steps 3 and 4. This proposal is widely considered to be the original source of the concept of graduated driver licensing (Baldock, O'Connor & Giles, 2000; Haworth, 1994).

While a number of American and Australian jurisdictions adopted some of the suggested GDLS components, New Zealand was the first licensing jurisdiction in the world to adopt what is considered to be the full GDLS model (i.e. including night-time driving and passenger restrictions) in August 1987 (Langley, Wagenaar, & Begg, 1996). This was followed by jurisdictions in Canada in 1994 and the USA in 1996 (Williams, 1999).

In Australia in 1983, the Federal Office of Road Safety proposed a five-stage GDLS process, which included passenger and night-time driving restrictions for unsupervised drivers (Drummond, 1994). This was not adopted by any of the states or territories. In 1989, the Federal Department of Transport, in an attempt to improve road safety, proposed a 10-point package including zero BAC restrictions, minimum permit and licensing ages, and a minimum permit holding period. From that time, Australian jurisdictions began to adopt some of these components, however, to date none conform to the full GDLS concept (Haworth, 1994).

Based on research by Williams and Mayhew (1999), the Insurance Institute for Highway Safety (IIHS, 1999, 2001a) proposed a three-stage GDLS model for the North American context. The model is presented in Table 3.1. As shown, a minimum Learner period of six months and both night-time driving and passenger restrictions for Provisional drivers were recommended. While a minimum Provisional period was not specified, it was recommended that night-time driving and passenger restrictions should not be lifted until age 18 years, regardless of whether full licence status was available prior to this age.

Table 3.1 The US/IIHS GDLS Model

Stage	Title	Requirements/ Restrictions
Stage 1	Learner permit	<ul style="list-style-type: none"> • Minimum entry age: 16 years • Mandatory holding period: 6 months • Minimum amount of supervised driving
Stage 2	Provisional licence	<ul style="list-style-type: none"> • Minimum age: 16 years 6 months • Night-time restriction for unsupervised driving: 9 or 10 pm to 5 am • Passenger restriction for unsupervised driving: No more than one teenage passenger (except for family members)
Stage 3	Full licence	<ul style="list-style-type: none"> • Minimum age at which night-time driving and teenage passenger restrictions are lifted: 18 years

Subsequently, many and varied GDLS models incorporating a wide range of requirements and restrictions were introduced or revised into existing licensing systems across the US and beyond. Evaluations of their effectiveness vary substantially, for a range of reasons (addressed in the following section). This variability is not trivial, with Preusser (1996) highlighting that the crash risk for 15-17 year-olds in the US varies by more than 100% across states.

There are two sets of best practice criteria that are well-known: The Insurance Institute for Highway Safety (2000) Classification of Licensing Systems and the conclusions from the

European Projects GADGET (Guarding Automobile Drivers through Guidance, Education & Technology) and DAN (Description and Analysis of post-licensing measures for Novice drivers) (Engström et al, 2003).

The Insurance Institute for Highway Safety (2000) classified GDLS programs into four categories: good, acceptable, marginal and poor. A “good” program included: a mandatory learner’s permit holding period of at least six months, and, during the intermediate (provisional) licence, either a night-time driving restriction that begins before midnight OR no passengers allowed unless supervised before the age of 17.

In Europe, two major, EU-funded projects have examined the role of GDLS for the European context. These are Project GADGET (Guarding Automobile Drivers through Guidance, Education & Technology) and Project DAN (Description and Analysis of post-licensing measures for Novice drivers). These conclusions and recommendations of these projects can be viewed as guidelines for European jurisdictions (Engström et al, 2003)¹:

- GDLS should be implemented and existing GDLS developed further with respect to driving-related goals and general life goals and living skills.
- A 2-5 year Provisional period should be implemented.
- Night-time driving restrictions are the most effective GDLS restriction; however novices in the EU are generally older (usually 18 years) than those in jurisdictions where the restriction has been effective (usually 16 years). Project DAN recommends they be promoted but not legislated; but also that supplementary transport options be made available at night, such as “disco buses”.
- While not yet as well-supported empirically, passenger restrictions are also considered an important GDLS initiative given the high rate of young driver crashes involving peer passengers.
- Alcohol restrictions are effective.
- Reduced speed limits for novices should not be applied. An early (1983) study found this initiative was associated with a higher rate of speeding among novices than full-licensed drivers. There are also additional risks associated with large speed differentials.
- A central index of traffic offenders should be maintained.
- A demerit point system for feedback to novices should be included, as well as feedback via small group discussions (up to 10 participants). While penalty points systems are not well evaluated, they provide clear rules for drivers and, when effected, provide additional incentives to drive safely (including voluntary driver improvement courses and psychological assessments for point discounts).
- There is a need for improved awareness of restrictions and for supporting enforcement (not necessarily by Police; parental enforcement has been found to be effective).
- Further education and supervision of related personnel is an important component of licensing developments.

¹ Note that some of these conclusions, such as those regarding night-time driving and peer passenger restrictions, pre-date some of the additional research that has now been published (and examined in the following sections).

Even though the research reached these conclusions, there is still some uncertainty whether all such changes would result in a ‘best-practice’ model. Indeed, the researchers highlight the need for further research to determine the effects of restrictions and resulting crash reductions during the Provisional period on subsequent crash involvement when first fully-licensed. Models could not be considered ‘best practice’ if, for example, due to strict exposure reductions, crash risk was merely shifted further along the graduated process into the first months of the full licence stage.

The Cochrane review of graduated licensing for young drivers (Hartling, Wiebe, Russell, Petruk, Spinolaand Klassen, 2004) concluded that the existing evidence shows that it is effective in reducing the crash rates of young drivers but the magnitude of the effect is unclear. It also concluded that the relative contributions of the different provisions within GDLS programs were uncertain.

This deems it near impossible to define what is a ‘best-practice’ GDLS model - neither in general, nor for the Australian (or indeed WA) context. Rather, the effectiveness of certain models and features must be assessed within the context of existing systems, circumstances and conditions.

Nonetheless, Meehan and McGinnis (1999) found that, in 1997, the proportion of teenage drivers involved in fatal crashes in US states without a GDLS was 20% higher than that in states with a GDLS (namely, those that included separate Learner and Provisional periods, with many including some form of night-time driving or passenger restriction; Preusser & Leaf, 2003; Simpson, 2003). Furthermore, they noted that the success of GDLS was more evident for male than female drivers. This was an important finding given the inflated over-representation of young male drivers in crash statistics. A paper to be presented at a US conference later this year (Chen & Baker, 2004) confirms the overall finding in relation to US states with a GDLS in place by end 2000 (based on data to 2002). It found that these jurisdictions experienced a combined 21% reduction in the fatal crash rate¹ of 16 year-old drivers in the year following implementation of the GDLS, compared to an 11% average for the US as a whole. Overall, these findings suggest that any GDLS that includes clear Learner and Provisional stages with additional requirements and restrictions to the full licence will provide fatal crash reduction benefits that are greater than any achieved with simpler licensing models.

3.2.1 Difficulties determining the effectiveness of GDLS models

Foss (2000) reported that all US jurisdictions that have enacted some form of GDLS have been able to demonstrate crash rate declines for beginner drivers. The size of this effect then ranged from 7% to 32% across jurisdictions. Foss noted, however, that while Learner and full licence GDLS stages were somewhat similarly enacted throughout the jurisdictions, Provisional licence components varied considerably and these differences contributed to the differing levels of effectiveness.

Variations in evaluation results among jurisdictions may also be due to a wide range of factors other than the GDLS models in place (Shope & Molnar, 2003; Simpson, 2003). Methodologies vary from study to study and few are able to include patterns of driving exposure or distance-travelled measures. Results can be complicated by declines in population and licensing rates and other contributing factors that are difficult to quantify.

¹ per 1,000,000 miles travelled

In addition, a lengthy period following GDLS implementation is necessary for reliable data. A GDLS must be in place long enough for people licensed under the previous system to move out of the new one (be issued a full licence). This often includes people who rush to be licensed in the previous system, which may also artificially raise the licensing rate just prior to the GDLS introduction and thus influence results for that period.

In addition, jurisdictions can differ on a number of levels before a GDLS is implemented, which can also affect the nature or extent of change following a new GDLS. These include general crash trends, licensing rates, distances travelled (exposure), and attitudes towards road safety - for the community at large, for the driving population and more particularly for young people. They can also differ in terms of the licensing systems (graduated or otherwise) in place prior to the introduction of the new GDLS.

One particular example regards seat-belt use. In many US jurisdictions seat-belt use is not mandated, therefore, introducing a GDLS that includes this requirement for novices would undoubtedly affect fatality rates even with low compliance, regardless of other GDLS features (e.g. see Evans, 1996). Such an evaluation may have little comparative value for jurisdictions that already mandate seat-belt use for all drivers.

Furthermore, jurisdictions can differ in the types and nature of other restrictions on young people in general; that is, not just drivers. For example, in many US states in which licensing is possible at 16 years of age there are night curfews for young people that apply to various age ranges (e.g. for 13-17 year olds) and the legal drinking age is often 21 years. Therefore, it could be expected that night-time driving restrictions and BAC limits will have a differential effect on the crash involvement of Provisional drivers in those jurisdictions compared to, for example, WA drivers who are not subject to a night curfew and can legally drink once 18 years of age.

Therefore, as concluded by Simpson (2003) and by Hartling et al. (2004), we do not know how much of the variability in GDLS effectiveness is attributable to differences in evaluation methodology, to the sites where studies have been conducted, or to the fundamental differences in the GDLS programs themselves. Readers should be mindful of these issues when considering the research findings.

3.3 Overview of GDLS models in Australia

The most common GDLS model in Australia is the typical three-stage model found overseas, that is, single-phase Learner and Provisional stages prior to the full licence stage. This model is currently found in the Northern Territory (NT), Queensland (QLD), South Australia (SA), Tasmania (TAS) and Victoria (VIC). While comprising only three stages, however, the systems in place in the Northern Territory and South Australia incorporate two options to progress through the stages, that is, traditional testing or what is known as Competency-Based Training and Assessment (CBTA).

Variations to this model occur in the remaining jurisdiction in the form of separate phases within the Learner or Provisional stage. The Australian Capital Territory (ACT) has a hybrid three-stage model that includes an optional second Provisional, CBTA phase. In WA, the Learner period has two phases, while in New South Wales (NSW) the Provisional period incorporates two phases. Notably, legislation has also been prepared in Tasmania to allow introduction of a five-stage system, comprising two Learner and two Provisional phases (Langford, 2004; see Langford, 2002).

Details of requirements and restrictions for the Learner phase and Provisional period in each Australian jurisdiction are summarised in Tables 3.2 and 3.3, respectively, adapted from Senserrick and Whelan (2003)¹. Key features of the GDLS of each state and territory are highlighted here.

Victoria has the most conservative age requirements, not allowing full licensure until 21 years of age. In four jurisdictions the minimum exit age is 20 years, for two others it is 19 years, while in the Northern Territory it is just 17.5 years (younger than the minimum age unsupervised driving is possible in Victoria).

Mandatory education and training vary substantially, from none in five jurisdictions, optional status for Learners in two jurisdictions (NT & SA) and Provisional drivers in another (ACT), to a requirement prior to issuing a Learner permit in one jurisdiction (ACT).

Supervisory driver requirements differ substantially, from minimum experience of one year of Provisional licensure (QLD) to, most commonly, any full licence (ACT, NSW, NT, SA & TAS), to two years of full licensure (VIC) or four years of licensure on the same class of licence (WA). One jurisdiction (TAS) also requires that there have been no suspensions of the full licence in the previous two years. In addition, some jurisdictions do not have regulations regarding BAC limits for supervisory drivers, while others stipulate a below 0.02% limit (NSW) or below 0.05% limit (VIC). In Queensland, supervisory drivers must hold an open driver licence, which carries a below 0.05% BAC limit. In South Australia and Tasmania, while a BAC regulation is not stipulated, a supervisory driver must be able to control the vehicle. Therefore, excessive alcohol consumption is not allowable, by default.

Two jurisdictions allow Learners and Provisional drivers to have below 0.02% alcohol present in their system: Western Australia and the Australian Capital Territory.

Mandatory logbooks to record driving experience are required in three jurisdictions. For two 50 hours is mandated (NSW & TAS), for the third only 25 hours is required (WA). In all cases, a range of driving conditions must be specified in logbook entries.

Five jurisdictions have set maximum speeds for Learners and/or Provisional drivers. Three do not allow Learners to tow and a fourth sets a maximum towing weight. Two also restrict towing weight for Provisional drivers (in one case in the first phase only). In four jurisdictions, driving of manual vehicles is only allowed if the driving test was passed in a like vehicle (again only in the first phase in one case).

Only one jurisdiction extends the Provisional period by the length of suspensions (TAS). Moreover, if a suspension occurs in the first year, the licence is cancelled and drivers must re-enter the licensing process from the beginning. Six jurisdictions have (in some cases alternatively) lowered the demerit point threshold for Provisional drivers (not NT or WA).

¹ Note that the information in these tables was cited in the original report as current to September 2002. Known changes or corrections are included, but others may have since come into effect. Conditions may also vary slightly when re-applying for a permit or licence (e.g. it is mandatory to re-sit the road knowledge law test when re-applying for the second phase learner permit in WA).

Notably, prior to lowering the demerit point threshold for Provisional drivers in Victoria, the Provisional period was not only extended by the length of the suspension, but also, for more serious offences, by the length of the suspension plus an additional six months.

Table 3.3 Summary of GDLS components of Australian Provisional licences

Component	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Minimum age	17 years (17.5 years P2)	P1: 17 years P2: 18 years	16.5 years (16 years if CBTA)	17 years	16.5 years	17 years	18 years	17 years
Practical test	Yes (No if CBTA)	P1: Yes P2: No	Yes (No if CBTA)	Yes	Yes (No if CBTA)	Yes	Yes	No
Hazard perception test	No	P1: No P2: Yes	No	No	No	No	Yes	Yes
Knowledge test	No	P1+P2: No	No	No	No	Yes	No	No
Length of Provisional period	3 years	P1: 1 year P2: 2 years minimum	1 year	3 years if aged <23 years; 2 years if 23-24 years; 1 year if >24 years	1 year minimum	3 years if aged <22 years; until 25 years if 22-24 years; 1 year if >24 years	3 years	2 years
Display P-plates	Yes (No for P2)	P1+P2: Yes	Yes	No	Yes	Yes	Yes	Yes
Transmission restriction	No	P1: Yes P2: No	Yes	No	No	No	Yes	Yes
BAC limit (g/100ml)	<0.02%	P1+P2: Zero	Zero	Zero	Zero	Zero	Zero	0.02%
Maximum speed restrictions	No	P1: 90 km/h P2: 100 km/h	100 km/h	No	100 km/h	80 km/h	No	No
Towing restriction	750 kg GVM	P1: max 250 kg P2: No	No	No	No	No	No	No
Vehicle power restriction	No	P1+P2: No	No	No	No	No	Yes	No
Night-time restrictions	No	P1+P2: No	No	No	No	No	No	No
Passenger restrictions	No	P1+P2: No	No	No	No	No	If licence disqualified in first year, one passenger only	No

Table 3.3 (cont.) Summary of GDLS components of Australian Provisional licences

Component	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Mandatory education and instruction	No (Voluntary if P2)	P1+P2: No	No	No	No	No	No	No
Effect of licence suspensions on length of Provisional period	No	P1+P2: No	No	No	No	P period extended by length of suspension; If during first year, licence cancelled not suspended	No	P period extended by length of suspension
Effect of licence cancellation on length of Provisional period	No	P1+P2: No	No	No	No	No	No	Must restart licensing process, Ps extended by length of suspension
Lower demerit point threshold: Length of licence suspension (or good driving option)	4 points: 3 months (8 points if P2)	P1: 3 points: 3 months P2: 6 points: 3 months	No	4 points in 12 months: 3 months	4 points: 6 months	4 points in 12 months: 3 months	5 points in 12 months: 3 months	No
Exit test	No	P1: No P2: Yes	No	No	No	No	No	No
Minimum age for full licence	20 years	20 years	17.5 years (17 years if CBTA)	20 years	19 years	20 years	21 years	19 years

Other requirements and restrictions (other than age) unique to only one jurisdiction include:

- Exclusion of an eyesight test (SA).
- A practical test during the Learner phase (WA).
- Mandatory pre-Learner education (ACT).
- Freeway driving restrictions for first phase Learners (WA).
- Three phases of graduated maximum speeds (NSW).
- Exclusion of *L*-plates and *P*-plates (QLD);
- Lifting of the *P*-plate requirement in an optional second Provisional phase (ACT).
- A vehicle power restriction (VIC).
- A passenger restriction for Provisional drivers after a licence disqualification (VIC).
- An exit test to full licensure (NSW).

Overall, while many conditions apply to each system, Australian GDLS models do not include some of the components found to be critical in reducing crash risk in overseas jurisdictions, most notably night-time driving and passenger restrictions. Several early studies attempted to examine the effectiveness of GDLS in Australia (e.g. Henderson 1972; Henderson & Messiter, 1970); however, Saffron (1981) found that these studies were largely inconclusive because the Australian data was not considered suitable to assess the effectiveness of GDLS in operation at that time.

3.4 Determining the effectiveness of specific GDLS features

Williams (2000) has indicated that the major GDLS contributions to crash reductions are delaying the age of full licensure and restrictions on late night driving and driving with peer passengers. These can be viewed as measures that largely reduce exposure to driving, which consequently reduce exposure to risk. However, there is a wide variety of additional restrictions and requirements that may be included in GDLS models that contribute to their effectiveness.

It is important to emphasise, however, that GDLS features do not act in isolation but as a component of an integrated system of initiatives that together determine effectiveness. Many GDLS requirements and restrictions are likely to have synergistic effects on young driver crash risk both within and across different licensing stages, such that changes to only one component can have an effect on the overall impact.

This particularly includes the interactive effects between driver education/training, licensing and testing. For example, if testing is not adequate to measure the actual skills intended to be measured, the education/training or practice in relation to those skills may well be adjusted to a minimum level. In contrast, if highly valid tests are used then it will be necessary to undergo adequate education/training and practice in order to pass them and proceed through the system.

From another perspective, changes can be made to one component in order to effect another. For example, mandating or changing minimum durations of licensing stages can

effectively change the age at which drivers progress through the system, which might be viewed more favourably and as more equitable within a given community in comparison to mandating minimum ages.

When examining the potential effectiveness of individual GDLS components, therefore, readers must be mindful that such effects are not mutually exclusive, and may well be dependent on other components or alter greatly with even small changes.

Foss (2002) has also highlighted the lack of research on individual elements of GDLS, and pointed out that not only is almost every GDLS different, but so too can be the nature of conceivably similar restrictions. For example, while many jurisdictions now include night-time restrictions, these vary greatly, commencing from as early as 9 pm to as late as 1 am with similarly differing end times.

Whilst these issues complicate interpretation, evaluations in the literature that have attempted to isolate the effects of specific GDLS components are one of few resources with which to assess the likely effectiveness of individual components. Data for the evaluations arise from two main sources. The first results when a GDLS has been implemented for long enough to provide useful research data. Accurate data are difficult to obtain within the first years of implementing a new system until people licensed under the old system are issued a full licence and people who rush to be licensed in the old system move out of it. Further, crashes are relatively rare events (Cairney, 1986; Simpson, 1996) and therefore often several years of data can be needed to detect differences. A second source is comparative data from jurisdictions with and without a GDLS in place that are considered to represent similar cohorts. Such evaluations are generally limited to the US and Canada.

The following sections seek to determine which components are potentially the most effective in reducing road trauma. Further research and developments, including well-controlled evaluations, are required in order to determine whether a GDLS model that incorporates all these key features will prove to be a 'best-practice' model across a range of jurisdictions.

3.5 Effectiveness of components of the Learner driver period

The US National Highway Traffic Safety Administration (NHTSA) proposes that a GDLS works on four levels by maximising driving experience, minimising crash risk exposure, improving driving skills and developing safer drivers. Whilst all four aims are addressed in the Learner period, the primary aim under a GDLS in this period is to maximise driving experience with an accompanying supervisory driver so as to gain necessary practice at particular driving skills under lower-risk situations.

Learner drivers, while under supervision, have the lowest level of crash risk. UK research has estimated that crash risk in the first year of unsupervised driving is at least 20 times higher than in a supervised driving environment (Forsyth et al, 1995). Current research in Sweden places this figure even higher at 33 times greater risk of an injury crash (Gregersen et al, 2003). Therefore, the supervised Learner period is the safest time to gain driving experience. If sufficient experience is not gained during this period, this transfers learning to the least safe driving period - the first months of unsupervised (Provisional) driving.

Many, indeed most GDLS features during the Learner stage, therefore, aim to increase the amount of supervised practice experienced.

3.5.1 Extending the supervised Learner period

One way to encourage high levels of driving experience is to have a lengthy Learner period (McKnight & Peck, 2002). This can be achieved in a number of ways, by:

- raising the minimum Provisional age;
- lowering the minimum Learner age; or
- mandating a minimum period in which a Learner permit must be held.

Both age and experience are related to the crash rates of novice drivers (Catchpole & Coutts, 2002; Drummond & Yeo, 1992; IIHS, 1999). GDLS can act on increasing both of these factors by allowing for a long period of supervised experience and delaying full driving privileges until minimum Learner periods and ages have been reached.

McCartt, Leaf, Farmer, Ferguson and Williams (2001) reported on Florida's extension of the minimum learner period from six months to 12 months, during which a minimum of 50 driving hours, including 10 hours at night is required. Young drivers were found to have obtained learner permits at a younger age, to have held these permits for longer periods of time, and to have logged more practice miles prior to licensure.

In 1989, South Australia raised the minimum Provisional age, while retaining the minimum Learner age. The minimum age to obtain a Provisional licence was raised from 16 years to 16.5 years. The minimum age for full licensure was also increased, from 17 years to 19 years, and a zero BAC requirement was introduced at the same time. The changes were found to result in reduced fatalities and serious injuries among drivers in these age groups; however, it was not possible to determine which of the changes or which combination of the changes influenced the findings (O'Connor & Giles, 2000).

In 1990 in Victoria, the minimum Learner age was lowered from 17 years to 16 years, while the minimum Provisional age of 18 years was maintained. This was associated both with earlier uptake of a Learner permit and increased hours of supervised driving experience before Provisional licensing. VicRoads (2002b) indicates that about 38% of all (car) Learner permit applicants are aged 16 years and about 15% of all applicants apply for the permit within one month of turning 16 years of age. Furthermore, Catchpole and Stephenson (2001) found that applicants who obtained their Learner permit in Victoria at age 16 years had on average 108 hours driving experience in comparison with those who obtained their permit at age 17 years who only accumulated an average 48 hours driving experience. No associated evaluation of crash involvement has been published to date.

More specific evaluations were conducted in Sweden and Norway, where a Learner period exists followed by licensing with a 'probationary' condition attached that attracts stricter penalties, but has no additional restrictions or requirements. Following their introduction of a GDLS, both countries lowered their minimum Learner age while keeping the licensing age stable at 18 years of age. In Sweden, the minimum Learner age was reduced from 17.5 years to 16 years. In Norway, the age reduction was from 17 years to 16 years. Sweden experienced a 15% reduction in crash risk for newly-licensed drivers based on this initiative (Gregersen, Berg, Engström, Nolén, Nyberg & Rimmö, 2000). Further, it was found that the 45-50% of Learners who utilised the period to gain more driving experience (average 118 hours) had a 40% lower crash risk (per kilometre) than those who did not (average 41 hours) (Gregersen, 1997, 2001). The study also found that drivers making use of the lowered age limit had a tendency to come from a higher socio-economic group. After adjusting for this factor, the crash risk benefit was still estimated to be substantial: about a 35% reduction. A

recently published evaluation of crash trends in Sweden from 1988-1998 has confirmed these crash reduction benefits (Murray, 2003).

In contrast, the Norwegian evaluation found that while 54.5% of Learners utilised the lower minimum age to commence learning before 17 years of age, there was only a small increase in supervised driving experience (by number of sessions and distance travelled) (Sagberg, 2000). No reduction in crash risk per kilometre was found for newly-licensed drivers.

Baughan and Simpson (2002) caution that a clearer understanding of the contrast between these two similar countries is needed before road safety predictions based on lowering the Learner age can be determined. It seems young people in Norway were not motivated to obtain a permit early and, therefore, a targeted education campaign may have been required to produce synergistic positive outcomes.

Notably, while Sweden introduced the initiative without other changes to their GDLS, Norway introduced some considerable additional changes (Baughan & Simpson, 2002). These included:

- use of *L*-plates during private instruction;
- increased requirements for supervisory drivers;
- removal of previously restricted driving conditions for Learners under private instruction, including, driving in city centres and on motorways;
- stricter penalties for newly-licensed driver violations, including loss of licence;
- more comprehensive testing, including increasing the practical test duration from 45 minutes to 80 minutes; and
- reduction in mandatory training components, including driving on slippery roads and in the dark.

Based on literature from the previous chapter on driver training, it is possible that the inclusion of mandatory training on slippery roads may have also counteracted potentially positive effects from the other measures.

3.5.2 Mandatory supervised driving hours

Mandating a minimum number of driving hours for Learner drivers aims to ensure all Learners establish a standard level of experience before attempting a licence test. It can also eliminate the potential for Learners to take the test after a minimal number of lessons resulting in the unfavourable situation of having to gain their driving experience once licensed.

Inexperienced drivers have an under-developed mental model of what is likely to happen in driving situations - gaining driving experience allows a more accurate mental model to develop (Triggs & Smith, 1994). Whilst simple driving skills (learning the road rules, changing gears) may take only a short period of time to develop, highly complex driving skills (including the judgement of hazards) are estimated to potentially take decades to develop fully (Evans, 1991). At a conceptual level, a minimum number of hours should represent a time period that will allow novices to learn basic essential skills and subsequently decrease their mental load when carrying out those skills. By decreasing mental workload

drivers are increasing automatic processes¹, which essentially allows them to devote more of their conscious attention to higher-order skills, with less-complex skills requiring less mental effort.

One Canadian and 36 US jurisdictions have mandatory supervised driving hour requirements (IIHS, 2003, 2004). Mandatory hours range from 12 to 50, with 50 being most common, being mandated in 15 US and the Canadian jurisdiction, Yukon. Twelve of these 16 jurisdictions stipulate that 10 of the 50 hours must be at night. Ten additional jurisdictions also include this requirement, while Alaska stipulates 10 of 40 hours in inclement weather and Georgia mandates 40 hours for Learners and 10 hours at night for Provisional drivers. Notably, again this GDLS requirement generally applies only to applicants under 18 years of age.

Another alternative is found in France (Baughan & Simpson, 2002). While the licensing system in France does not represent a GDLS model as there is no Provisional period, it does include a mandatory Learner experience requirement. This is not, however, a number of hours but rather a minimum distance that must be travelled, namely 3,000 kms in total.

Mandatory logbooks

Waller (1993) suggested that beginning drivers should be required to submit documentation about the extent of their driving experience and that licensing jurisdictions should require minimum amounts of driving experience be demonstrated in order to apply for a licence (rather than simply specifying minimum permit-holding periods). The requirement to record driving hours in dated logbook entries provides a means to verify that driving hours required have been undertaken over a period of time and to ensure applicants who may have previously attended the driving test after a minimal number of supervised lessons will have undergone an amount of driving experience considered minimal before unsupervised driving. Logbooks also send a clear message to the community that obtaining sufficient driving hours rather than just passing a practical test is important.

Notably, Waller (1993) also recommended that no great effort should be extended to enforce verification of documented driving experience – that instead the process should be used to encourage an increase in driving experience. In the US, high levels of parental involvement are encouraged to help facilitate such initiatives. For example, in Michigan, parents must provide written permission before Learners can enter the first level of licensing. They are considered in charge of supervising logbook entries and are notified of any violations of GDLS regulations until the driver turns 18 years of age (BSD Consultants, 2000). Waller et al (2000) found that parental involvement greatly increased the amount of supervised driving experience achieved. While 50 hours was mandated, on average, 75 hours were reported.

In Australia, while WA mandates penalties for both Learner drivers and their supervisors for providing false or misleading statements in their logbooks, to date these have not been enforced (i.e. no-one has been charged). In contrast, Victoria does not mandate minimum driving hours, but rather encourages Learners to gain 120 hours of driving experience and provides logbooks to complete on a voluntary basis (VicRoads, 2000). Catchpole and

¹ While the concept that driving (as a whole) is automated is questionable (Groeger, 2000), the term is used here to describe tasks that can be carried out with little conscious effort - due to experience that has been gained. It is not suggested that all aspects of driving become automated.

Stephenson (2001) conducted a survey of driving experience amongst Learners in Victoria. They found that for all ages and across all of Victoria, the average number of hours that Learners accumulate with a supervisor and professional driving instructor was 83 hours, with those acquiring their permit at 16 years of age reporting the most experience at 108 hours. This is in line with experience levels in the abovementioned research in Sweden that found gaining about 120 hours of supervised driving experience compared to about 40 hours resulted in 40% lower crash risk (Gregersen, 1997).

Notably however, Catchpole and Stephenson (2001) also found that there has not been a high rate of usage of the logbooks. Their study found that 30% of Learners had not received the logbooks and, of the 70% who had, only 21% reported using them. To improve the usage rate, logbooks are now included in Victoria's road safety and road law handbook (*Road to Solo Driving*), which pre-Learners need to study in order to pass their Learner test (VicRoads, 2000). In addition, Victoria's Traffic Accident Commission (TAC) provides a scratch card system that encourages Learners to keep track of their hours by scratching off a box on the card every time they accumulate an hour of driving experience. The scratch cards have a capacity to record 120 hours of driving. While the logbook system is, therefore, not well-used at present, Victoria, like many jurisdictions, also tries to ensure that permit holders will maximise their driving experience by requiring them to hold their Learner permit for a minimum period of time.

A notable concern with providing logbooks and encouraging varied experience, is that there are few guidelines for Learners or parents on how to structure that experience or on what conditions pose the greatest risk (Berg, Gregersen & Laflamme, 2004). The need to graduate driving experience from lower to higher-risk conditions is sometimes recognised in supporting materials in relation to building up from short to long trips, from clear to poor weather and/or from light to heavy traffic. These are only a few of a range of additional or overlapping recommendations that could be highlighted, for example:

- off-road (carpark etc) to on-road;
- low to high speeds or low-speed roads to high-speed roads;
- daylight to darkness conditions, as well as day to night;
- weekday evenings/nights to weekend evenings/nights;
- with no additional passengers to increasing additional passengers¹; and
- automatic to manual vehicles, when possible.

Notwithstanding these recommendations, there is still a general lack of information or guidelines on how to graduate experience towards the higher-risk situations or how to assess whether the Learner has developed sufficient skills and lower levels before progressing to subsequent levels. Competent handling of a vehicle is only a first step and can be greatly misleading in determining preparedness for the more higher-risk situations that require much more advanced cognitive skills and safety-focused attitudinal-motivational orientations, which are rarely addressed in jurisdictions worldwide.

Further research and developments are needed to assist parents and Learners to better achieve more structured, graduated experience during this critical stage.

¹ as stressed by the University of North Carolina Highway Safety Research Centre (1996)

3.5.3 Supervisory driver requirements

Given that both young age and inexperience are critical crash-risk factors (Drummond & Yeo, 1992; IIHS, 1999), age and experience-based requirements for supervisory drivers aim to ensure that only experienced and non-peer drivers take on this role. Mandating minimum requirements for supervisors should both reduce the crash risk of the Learner and increase the likelihood that the supervisor has developed critical higher-order cognitive skills to enhance the experiential learning process.

Generally, supervisors include professional driving instructors, parents, relatives, carers or friends of the Learner driver. While instructors can provide professional training, parents and others acting as supervisory drivers provide support and facilitate the accumulation of on-road supervised experience (VicRoads, 2002c). While in some countries driving instruction is only allowed by accredited professionals (e.g. Denmark, Germany, The Netherlands; Gregersen et al, 2003), other jurisdictions, such as Michigan in the US, strongly rely on the involvement of parents (BSD Consultants, 2000). As noted earlier, Michigan parents must provide written permission before Learners can enter the first level of licensing, are in charge of supervising logbook entries, and are notified of any violations of GDLS regulations until the driver turns 18 years of age.

The earlier examination of requirements in Australian GDLS models (Section 3.3.1 and Table 3.2) found a range from minimum experience of one year of Provisional licensure (Queensland) to two years on a full licence, and from no BAC restriction to a less than 0.02% limit. In addition, one jurisdiction mandates that the full licence must not have been suspended in the previous two years. Sweden also has a limit on the demerit points a supervisory driver can incur (Berg et al, 2004). Table 3.4 lists the requirements in place in some overseas jurisdictions for comparison (Baughan & Simpson, 2002; Berg et al, 2004; IIHS, 2004).

In comparison to international models, therefore, while Queensland can be viewed as having the most lenient requirements of any Australian jurisdiction, this corresponds to a minimum age of 18 years, in line with age equivalents in many overseas jurisdictions. Nonetheless, this does not meet the primary objective of supervisory requirements in ensuring an adequate standard of driving experience and a non-peer role to the Learner driver.

Table 3.4 Minimum requirements for supervisory drivers in overseas GDLS models

Location	Jurisdiction	Minimum requirements		
		Licence		Age
		Status	Holding	
North America	Alabama, Nova Scotia	Full licence	-	-
	Colorado, Florida, Kentucky, Maryland, Massachusetts, Michigan	Full licence	-	21 years
	California, New Hampshire	Full licence	-	25 years
	Ontario	Full licence	4 years	-
	North Carolina	Full licence	5 years	-

Other countries	New Zealand	Full licence	2 years	-
	Finland	Full licence	3 years	21 years
	France	Full licence	3 years	28 years
	Norway, Sweden	Full licence	5 years	25 years

Requirements based on years of full licensure also may not avoid the possibility of peer supervisors in some circumstances. For example, until 1999, New Zealand mandated a minimum age of 20 years for supervisory drivers in addition to the two years of full licensure. The removal of this requirement results in an age overlap between allowable supervisory drivers and restricted passengers for Provisional drivers. Supervisory drivers can be a minimum age of 19 years, yet passenger restrictions apply to passengers under 20 years of age. Such inconsistencies can be overcome by mandating minimum ages in addition to minimum licensure requirements.

Just as important is the lack of BAC limits for supervisory drivers. Ontario (Baughan & Simpson, 2002) and a number of Australian jurisdictions have introduced a 0.05% or less than 0.05% BAC limit, while in New South Wales the limit is less than 0.02%. Mayhew and Simpson (1999) stated that it is worthwhile encouraging zero BAC limits for supervisory drivers, given they play such an important role in the learning experience and especially as this may require having to take over the driving; therefore, they should not be impaired. Mandating a zero BAC limit sets an example to the Learner that even small amounts of alcohol are considered to have an effect on driving.

3.5.4 Processes that encourage early licensure

Several processes can encourage early licensure. These include having Learner permits with a limited tenure and requiring reassessment to renew the permit. Such conditions are likely to influence some Learners to cram for their Provisional tests near the end of the expiry period to avoid additional costs or examinations.

In order to reduce the prevalence of drivers obtaining early licensure, Victoria introduced a lengthy car Learner permit in 1998 that extends for 10 years and is renewable simply by paying a fee; however, there is no published research on how this has changed licensing patterns. While it can be argued a lengthy tenure may include long periods of absences from driving, this is unlikely to be problematic during the Learner phase when a supervising driver must always be present.

Educational initiatives are also in place in several jurisdictions that reduce the minimum holding period of Learner permits. Mayhew, Simpson, Ferguson and Williams (1998a) expressed concern that this incentive may compromise safety as it assumes that education provides road safety benefits at least equivalent to that obtained from real-world driving experience. In fact, education initiatives that allow early licensure have been shown to increase crash risk. The 'classic' study in this area was a large controlled trial of two driver-training programs in the De Kalb County in the US (Stock, Weaver, Ray, Brink, & Sadof, 1983). The initial review, while finding no overall differences, reported a reduction in crashes and traffic violations for trained groups in the first six months compared to a control group. However, a later reanalysis (Lund, Williams & Zador, 1986) found the benefits reported during the first six months were more than fully offset by the earlier

licensure of one of the training groups that in fact contributed to increased crashes and violations for these drivers (Christie, 2001). A recent analysis of the effect of a UK education program that resulted in early licensures also reported increases in crash rates: by 45% for 16-19 year olds and 7% for 20-24 year olds (Boase & Tasca, 1998).

Mayhew, Simpson, Williams and Desmond (2003b) recently examined this issue in Nova Scotia. During 1994, the Learner period was extended from two months to six months, but reduced to three months if a driver education program was undertaken. It was found that drivers who chose the education option had higher crash rates than those holding their licence for the full six months.

Notably, New Zealand removed the option to reduce the minimum Learner permit holding period by completing an education campaign in 1999 (Begg, Stephenson, Alsop, & Langley, 2001).

3.6 Effectiveness of components of the Provisional period

3.6.1 Extending the Provisional period

The aim of the Provisional period is to allow drivers to gain unsupervised driving experience under lower risk situations than at full licensure. Similar to the Learner period, there are three GDLS approaches used to extend this period:

- raising the minimum age at full licensure;
- lowering the minimum Provisional age; or
- mandating a minimum period in which a Provisional licence must be held.

Setting a licensing age represents a compromise between many factors, including society's expectations of a level of maturity at which young people can be considered responsible enough to drive, the safety of young drivers and other road users, the mobility needs of young drivers, along with the independence, freedom, status and peer recognition that a driver licence brings (Williams, 1995).

Early estimation of the crash benefits associated with higher licensing ages in the US (Williams, Karpf, & Zador, 1983) suggested fatal crashes could be reduced by as much as 65-70% without increasing rates at older ages. In Australia, Drummond (1986, 1994) concluded that raising the licensing age results in a net road safety saving due to the elimination of crashes associated with earlier licensing (see also Williams, 1995). Conversely, reducing the licensing age is associated with increasing crash risks. In Canada, when the licensing age was reduced from 18 years to 16 years, there was an associated 24% increase in fatalities among new drivers (Gaudry, 1987, cited in Gregersen & Bjurulf, 1996).

In 1998, Northern Ireland increased the Provisional period from one to two years (Hewitt, 1994; Hewitt & Ferguson, 1992). Hewitt and colleagues evaluated the effectiveness of this initiative during the five-year period post-licensing. Compared to a control group, no differences were found in the overall crash rates¹ of Provisional drivers in the first year of driving; however, of these crashes, those involving Provisional drivers were more likely to

¹ per annual mileage

result in no injuries compared to controls and crashes in consecutive years (2-5 years). Overall, while some positive findings were reported, the study did not include comparisons of pre and post-GDLS crash rates and, therefore, the results are somewhat inconclusive.

While many jurisdictions overseas have a 12-month Provisional holding period before graduation to a full licence, many Australian jurisdictions have a three-year Provisional period (ACT, NSW, QLD, TAS & VIC). Victoria increased the Provisional period from two years to three years in 1990. New South Wales also increased its Provisional period to three years in 2000 (Roads and Traffic Authority, 2000). In the context of his research on the zero BAC limit for Victorian Provisional drivers, Christie (1996) found that a 2-3 year Provisional period was effective in terms of reduced alcohol-related crashes, and that, while three years may not confer a marked advantage over two years, one year was insufficient.

Partly as a result of these lengthy Provisional periods, most Australia jurisdictions have comparatively high minimum ages for full licensure (generally 20-21 years) than overseas jurisdictions, such as those in the US (most commonly 17 years but also younger). For jurisdictions that already have a high licensing age, Ulmer, Preusser, Ferguson and Williams (1999) have suggested an alternative to mandating an even higher licensing age is to impose strategies that encourage people to delay applying for a licence, including making it more difficult or costly to apply for a licence. Ulmer et al found that a concern that such initiatives may have a greater impact on poorer/disadvantaged groups was not substantiated. In Sweden, the introduction of a new 25% tax on driving lessons was introduced in 1997. That year, the proportion of licence holders among 18 year-olds (the minimum age for first driving unsupervised) decreased to 26% from 29% in the previous year (Murray, 2003).

3.6.2 Night-time driving restrictions

Night-time driving restrictions are considered to be one of the most effective components of GDLS in North America and New Zealand. Contrary to some perceptions, they do not aim to eliminate all night-time driving for inexperienced drivers. Rather, they aim to target the high proportion of novices' driving that takes place at night in recreational circumstances; often in the presence of peers. Driving is generally allowed at night for non-recreational purposes, such as travel for work, education and other purposes considered essential, and whenever an appropriate supervisory driver is present. Such restrictions can play an important role in raising community awareness of the risks associated with driving at night.

Increased crash risk at night is common worldwide; moreover, this risk has been shown to be magnified for young drivers (Maycock, 2002; Williams, 1996). This is believed to be due to a number of factors, including impoverished visual information and increased likelihood of fatigue or alcohol-involvement, but also due to young drivers spending proportionally more of their time driving during these hours than other drivers and usually in recreational circumstances and with their same-aged friends as passengers (Clarke, Ward & Truman, 2002; Crettenden, Yeo & Drummond, 1994; Ferguson, 2003; Keall, Frith & Patterson, 2004; Williams, 2003; Williams & Ferguson, 2002). During recreational driving, even drivers who generally try to follow the roads rules can be more easily distracted or encouraged to take risks.

In Australia, night-time hours present the highest fatality risk for drivers aged less than 26 years, with the midnight to 6 am period on weekends accounting for more than double the number of fatalities than during all other hours (ATSB, 2002). UK research estimates crashes at night are 2.6 times more likely than crashes during the day (Maycock, 2002), while US research suggests for young drivers this risk is three times more likely (Williams, 2000).

A more recent US paper, confirms the likelihood of causing an injury crash increases with advancing night-time hours for 16-17 year-olds, with 10 pm to midnight representing the highest risk (Rice, Peek-Asa & Kraus, 2003a).

Night-time driving restrictions are currently in place in New Zealand, three Canadian and 38 US jurisdictions (Begg et al, 2001; IIHS, 2003, 2004). In some jurisdictions they not only apply to Provisional drivers but also to Learner drivers, the differential effects of which cannot readily be determined. As reported in the previous sections regarding the Learner period, crashes are rare and injury risk lowest during this supervised licensing stage, which deems it a safer period in which to gain experience driving at night than the unsupervised Provisional period. Recent research in New South Wales found that the increased risk of night-time driving for drivers under age 25 years only applied to Provisional and fully-licensed drivers – not Learners (Lam, 2003).

Moreover, the most protective factor against crashes as a Provisional driver is much and varied experience as a Learner. For these reasons, night-time driving restrictions are discussed here in relation to Provisional drivers only, for whom the restrictions are considered most befitting. For Learner drivers, the need to graduate experience from lower to higher risk conditions, including from daytime to night-time driving, but also in many other ways, is considered necessary to address through improvements to mandatory driving hours requirements and education/supporting materials for supervisory drivers, as discussed earlier in Section 3.5.2.

Night-time restricted hours vary from times between 9 pm to 6 am, although the most common restriction is between 12 am to 5 am (12 jurisdictions respectively; IIHS, 2004). South Carolina is a noteworthy exception, with by far the lengthiest restriction, commencing from 6 pm or 8 pm during daylight savings through to 6 am (from age 15 years), while Idaho stipulates from sunset to sunrise. These are followed by New York and North Carolina, with driving restricted between 9 pm to 5 am. Some states vary the restrictions by day of the week, such that they begin at 11 pm on week nights and midnight or 1 am on weekend nights (District of Columbia, Illinois & Indiana), while the District of Columbia also has a seasonal variation, with the varied hours applying from September to June, and a standard midnight to 6 am restriction applying from July to August.

Table 3.5 presents some examples of time variations based on GDLS models that have undergone evaluation (Coben & McKay, 2003; Falb, 2003, cited in Hedlund & Compton, 2004; Foss, Feaganes & Rodgman, 2001; IIHS, 1999, 2002; Kentucky Transportation Centre, 1999, cited in Baughan & Simpson, 2002; Margolis, 2004; Masten & Hagge, 2003; Mayhew et al, 1999; McKnight, Hyle & Albricht, 1983; Rice, Peek-Asa & Kraus, 2003b, cited in Hedlund & Compton, 2004; Shope, Molnar, Elliot & Waller, 2001; Ulmer, Preusser, Williams, Ferguson & Farmer, 2000).

As shown, there is much variation in how the restrictions apply, whether they differ at different licence phases or for different age groups. Notably, California applies a unique variation in that a passenger restriction (no passengers under 20 years of age) also apply during the first Provisional phase and then in the second Provisional phase these restrictions are combined such that the passenger restriction applies only during the night-time hours of 12 to 5 am.

There is strong support for the implementation of night-time driving restrictions for young drivers based on research that suggests they are an essential component of GDLS models that have achieved the most successful results in terms of crash and injury reductions

(Ferguson, Leaf, Williams & Preusser, 1996; Lin & Fearn, 2003; Williams & Preusser, 1997). NHTSA (2000) estimated that night-time driving restrictions have been associated with crash reductions of up to 60% during the restricted hours. As noted by Lin and Fearn (2003), substantial crash reductions have been reported even when restrictions are valid for only six months.

Table 3.5 Examples of some GDLS models with night-time driving restrictions

Jurisdiction	Licence phases (minimum age/holding) & applicability	Night-time driving restriction
New Zealand	<ul style="list-style-type: none"> • Learner (15 years/6 months) • Provisional (15.5 years/18 months) • Full (17 years) • All new drivers 	<ul style="list-style-type: none"> • 10pm to 5am Learner • 10pm to 5am Provisional
California	<ul style="list-style-type: none"> • Learner (15 years/6 months) • Provisional I (15.5 years/6 months) • Provisional II (16 years/6 months) • Full (18 years) • All new drivers under 18 years of age 	<ul style="list-style-type: none"> • 12am to 5am Provisional I
Florida	<ul style="list-style-type: none"> • Learner I (15 years/3 months) • Learner II (15.25 years/9 months) • Provisional (16 years/12 months) • Full (18 years) • All new drivers under 18 years of age 	<ul style="list-style-type: none"> • 7pm to 6am Learner I • 10pm to 6am Learner II • 11pm to 6am Provisional 16 year olds • 1am to 5am Provisional 17 year olds
Iowa (2003)	<ul style="list-style-type: none"> • Learner (14 years/6 months) • Provisional (16 years/12 months) • Full (17 years) • All new drivers under 18 years of age 	<ul style="list-style-type: none"> • 12:30am to 5am Provisional
Kentucky	<ul style="list-style-type: none"> • Learner (16 years/180 days) • Provisional (16.5 years/12 months) • Full (18 years) • All new drivers under 18 years of age 	<ul style="list-style-type: none"> • 12am to 6am Learner • 12am to 6am Provisional
Maryland	<ul style="list-style-type: none"> • Learner (15.75 years/4 months¹) • Provisional (16.1 years/12 months) • Full (18 years) • All new drivers 	<ul style="list-style-type: none"> • 12am to 5am Provisional
Michigan	<ul style="list-style-type: none"> • Learner (14.75 years/6 months) • Provisional (16 years/6 months) • Full (17 years) • All new drivers under 18 years 	<ul style="list-style-type: none"> • 12am to 5am Provisional
North Carolina	<ul style="list-style-type: none"> • Learner I (15 years/6 months) • Learner II (15.5 years/6 months) • Provisional (16 years/6 months) • Full (16.5 years) • All new drivers under 18 years of age 	<ul style="list-style-type: none"> • 9pm to 5am Learner I • 9pm to 5am Provisional
Nova Scotia ²	<ul style="list-style-type: none"> • Learner (16 years/3-6 months) • Provisional (16.25-16.5 years/2 years) • Full (18.25-18.5 years) • All new drivers 	<ul style="list-style-type: none"> • 12am to 5am Provisional

Table 3.5 (cont) Examples of some GDLS models with night-time driving restrictions

Jurisdiction	Licence phases (minimum age/holding) & applicability	Night-time driving restriction
Ontario ²	<ul style="list-style-type: none"> • Learner (16 years/8-12 months) • Provisional (16.67-17 years/12 months) • Full (17.67-18 years) • All new drivers 	<ul style="list-style-type: none"> • 12am to 6am Learner
Pennsylvania ³	<ul style="list-style-type: none"> • Learner (16 years/6 months) • Provisional (16.5 years/12 months) • Full (17.5-18 years) • All new drivers under 18 years of age 	<ul style="list-style-type: none"> • 11am to 5am Learner • 11am to 5am Provisional

¹ Prior to 1999, the minimum holding period was two weeks

² CBTA option to shorten Learner period and thereby reduce minimum age at subsequent stages

³ CBTA option to shorten Provisional period

Positive effects of New Zealand's night-time driving restrictions were reported by Begg et al (2001). They compared 1980-1995 Police-reported crash data linked to hospital records to compare the crash involvement of pre and post-GDLS drivers (with the GDLS introduced in 1987). The evaluation revealed a statistically significant reduction in the number of night-time crashes post-GDLS. Furthermore, there appeared to be a carry-over effect of reduced night-time crashes in the fully-licensed period for post-GDLS drivers in comparison to pre-GDLS drivers. As passenger and 0.03% BAC restrictions were introduced at the same time, the findings could not be attributed solely to the night-time driving restrictions. Nonetheless their value in contributing to fatality and injury reductions cannot be overlooked. A recent discussion by Begg and Stephenson (2003) emphasised that, since the introduction of the GDLS, both the number and rate¹ of serious injuries and fatalities of 15-24 year-old vehicle occupants have nearly halved. Notwithstanding other contributing factors, they state there is little doubt that GDLS restrictions have been the most important factor influencing this outcome.

More specific estimates of the size of the effect of night-time driving restrictions hail from the US and Canada (Coben & McKay, 2003; Falb, 2003, cited in Hedlund & Compton, 2004; Foss et al, 2001; IIHS, 1999, 2002; Kentucky Transportation Centre, 1999, cited in Baughan & Simpson, 2002; Margolis, 2004; Masten & Hagge, 2003; Mayhew et al, 1999; McKnight et al, 1983; Rice et al, 2003b, cited in Hedlund & Compton, 2004; Shope et al, 2001; Ulmer et al, 2000). A summary of the research based in jurisdictions where the restrictions apply to Provisional drivers is presented in Table 3.6, including year of publication of the evaluation, the target group, outcome measure, study results and other comments on the method and findings. A basic outline of the GDLS stages and restricted night-time periods applicable in these jurisdictions were listed in the previous table, Table 3.5.

¹ per 100,00 population

Table 3.6 Effectiveness of GDLS models that include Provisional night-time driving restrictions

Jurisdiction & Publication year	Target group & Outcome measure	Crash/injury reductions	Comments on method/findings
California (2003)	<ul style="list-style-type: none"> • 15-17 year-old drivers • Crashes 	<ul style="list-style-type: none"> • 0.4% night-time (sudden & permanent) 	<ul style="list-style-type: none"> • Confounded by indication 18-19 year-olds delayed licensure until restrictions did not apply • Recommended restricted hours be expanded
California (2003)	<ul style="list-style-type: none"> • 16-17 year-old drivers • Crashes per capita adjusted for exposure 	<ul style="list-style-type: none"> • 17-18% injury • Greater for serious injury & night-time • Slight total 16 year olds • No significant change total 17 year olds 	<ul style="list-style-type: none"> • Suggests not total number but more severe crashes are reduced
Florida (2000)	<ul style="list-style-type: none"> • 15-17 year olds • Crashes 	<ul style="list-style-type: none"> • 17% night-time • 9% total • 19% 15 year olds • 11% 16 year olds • 7% 17 year olds 	<ul style="list-style-type: none"> • No reductions found in control jurisdiction
Iowa (2003)	<ul style="list-style-type: none"> • 16 year-old drivers • Crashes post GDLS introduction 	<ul style="list-style-type: none"> • 14% first year • 16% second year • 22% third year 	<ul style="list-style-type: none"> • Convictions dropped 36%, 31% & 30% in respective years
Kentucky (1999)	<ul style="list-style-type: none"> • 16 year-old drivers • Crash rate per driver 	<ul style="list-style-type: none"> • 33.5% night-time • 27.6% fatalities • 34.5% injury • 30.5% alcohol-related 	<ul style="list-style-type: none"> • No change in crash rate for control group of drivers
Maryland (1983)	<ul style="list-style-type: none"> • 16-17 year olds • Crashes 	<ul style="list-style-type: none"> • No significant change night-time • 5% daytime 	<ul style="list-style-type: none"> • Attributed results to low pre-GDLS crash rate during restricted period • Recommended restricted hours be expanded
Michigan (2001)	<ul style="list-style-type: none"> • 16 year olds • Crash rate per 1,000 population 	<ul style="list-style-type: none"> • 53% night-time • 24% daytime • 21% evening • 29% single vehicle • 23% multiple vehicle 	<ul style="list-style-type: none"> • Recommended restricted hours be expanded

Table 3.6 (cont) Effectiveness of GDLS models that include Provisional night-time driving restrictions

Jurisdiction & Publication year	Target group & Outcome measure	Crash/injury reductions	Comments on method/findings
North Carolina (2001)	<ul style="list-style-type: none"> • 16 year olds • Crash rate per 10,000 population 	<ul style="list-style-type: none"> • 43% night-time • 25% total • 23% non-injury • 20% daytime 	<ul style="list-style-type: none"> • Greater decline in single-vehicle than multiple-vehicle crashes
North Carolina (2004)	<ul style="list-style-type: none"> • 16 year-old drivers • Hospitalisation rates 	<ul style="list-style-type: none"> • 3.4 per month down from 6.2 per month 	<ul style="list-style-type: none"> • Associated 41% decline in hospital charges
Nova Scotia (1999)	<ul style="list-style-type: none"> • 16 year-old drivers & all novice drivers • Crashes 	<ul style="list-style-type: none"> • 24% total 16 year olds • 19% total novice drivers 	<ul style="list-style-type: none"> • 37% total over first three years
Nova Scotia (2002)	<ul style="list-style-type: none"> • 16-18 year-old Learners, 16-19 year-old Provisional • Crashes 	<ul style="list-style-type: none"> • 51% total Learners • 9% first year Provisional • 11% second year Provisional 	<ul style="list-style-type: none"> • Attributed to the night-time restrictions which reduced crashes during restricted hours by ~50%
Pennsylvania (2003)	<ul style="list-style-type: none"> • 16-17 year-old drivers • Crashes 	<ul style="list-style-type: none"> • 28% 16 year olds • 2% 17 year olds 	<ul style="list-style-type: none"> • Crashes for 18-21 year-olds increased slightly

Overall it can be seen that night-time restrictions have been associated with reductions in crashes and/or injuries during the restricted night-time hours in almost all evaluations. Benefits were also found outside the restricted period (daytime) and overall. Methodologies varied, as did factors such as pre-GDLS crash rates, the number of licensed drivers in each jurisdiction, and varying combination of restrictions and requirements that were also introduced at the time of the night-time driving restriction (including such restrictions for Learners). A low BAC limit (zero to 0.03%) was also introduced in all the evaluation jurisdictions, with the exception of Michigan. California also introduced the abovementioned passenger restriction, while Nova Scotia restricts Provisional drivers to only one front seat passenger. All these differences contribute to the wide variation in the size of reductions in outcome measures; from small up to a 53% reduction in crashes during the restricted period. Most importantly, however, when examined, fatalities and injuries were reduced in all evaluations to a significant extent, at least one-fifth to one-third. This suggests that when total crash numbers show little variation (while adjusted measures of crashes such as crash rates all show benefits), the severity of crashes was nonetheless reduced.

Also importantly, concerns regarding shifting crash rates to other drivers or time periods have not been supported. Carseldine (1998) reported concern that introducing night-time driving restrictions would shift the rate of crashes to fully-licensed drivers who would consequentially transport the novice drivers as passengers. Williams (1995), however, found

this concern to be unsupported in his research of crash-based data. Williams (1995) did find support for the concern that crash frequency would rise just prior to the start of the restricted period as drivers returned home or to another location for the evening. However, while crashes did appear to rise at such times, Williams found that over-riding positive effects prevailed during the restricted hours that more than compensated for this increase. More recent research by Begg et al (2001) in New Zealand found no such effect of crashes increasing during the non-restricted period.

There is clear consensus among a range of road safety researchers and agencies, that night-time driving restrictions should form part of any GDLS (e.g. Begg & Stephenson, 2003; Preusser & Stewart, 2001; Williams & Ferguson, 2002). Project GADGET (Siegrist, 1999), an ongoing project examining road safety initiatives in Europe, also recommends that restrictions should apply to all young drivers at night during their first year of unsupervised driving.

Adams (2003b) has recently reported on WA crash and injury patterns at night, comparing rates during the day (6 am to 5 pm), evening (5 pm to 10 pm) and at night (10 pm to 6 am) for 17-18 year-olds and 19-59 year-olds. Proportionally more driver and passenger injuries occurring at night were associated with crashes involving the younger group as drivers compared to the older group, although injury rates could not be calculated by time period due to a lack of exposure data. There was, however, some indication when the time of day was divided into three-hour blocks, that the younger group crashed more often than the older group during the hours of 9 pm to 3 am (also found for first-year drivers by Palamara et al, 2002), and that they had a greater proportion of fatality and serious injury crashes at night compared to the older group. Without driving exposure information by time of day, this research is only preliminary given that young drivers are known to drive more often at night than more experienced drivers (e.g. Williams, 2003). The age range of the comparison group is also problematic given that the research does not report controlling for the licence status of participants, and therefore may include Provisional drivers in the comparison group. Further research is necessary, therefore, to determine whether young WA drivers have a greater crash risk at night and which time periods represent the greatest risk.

3.6.3 Peer passenger restrictions

While night-time driving restrictions are considered highly effective, some road safety professionals would argue that they cannot substitute for passenger restrictions that operate all day (Chen, Braver, Baker, & Li, 2001). Passenger restrictions aim to reduce the crash risk of both the novice drivers and the passengers that they carry. Contrary to some perceptions, they do not always apply to all passengers but rather target the high proportion of novice driving that takes place in recreational circumstances with peers. Passenger restrictions require that the novice driver does not carry restricted passengers unless an appropriate supervisory driver (most often fully-licensed and over 20 years of age) is present. Family members are generally exempt, so that regular purposeful driving is not compromised. In New Jersey, which has the highest minimum Provisional age at 17 years, the exemption applies to household members (IIHS, 2004).

The increased risk of a crash for novice drivers carrying passengers is well documented (Aldridge, Himmler, Aultman-Hall & Stamatiadis, 1999; Cooper, Atkins & Gillen, in press; Mitsopoulos & Regan, 2001; Williams, 2000, 2001). In the US, Aldridge et al (1999) showed

that young drivers had a lower risk than older groups of crashes with adult and/or child passengers, but greater risk when carrying peer passengers. Williams (2000) found that passengers who were peers of the driver placed themselves at an increasingly elevated crash risk with every additional passenger. The presence of 2-3 passengers increased fatal crash risk by a factor of 4-5 times the risk when driving alone (see also Chen, Baker, Braver & Li, 2000). Williams (2001) also reported that 63% of teenage passenger fatalities occurred when other teenagers were driving. An in press article demonstrates that for all young driver groups under age 25 years, the presence of teenage passengers increases crash risk, while for drivers over age 25 years their presence is associated with decreased risk (Cooper, Atkins & Gillen, in press).

Similar results have been found in Australia, where drivers under 21 years of age have been shown to carry more passengers, both during the day and at night, on non-work related trips compared to other age groups (Crettenden et al, 1994). Recent research in New South Wales has found the risk of a fatal or serious injury crash increases incrementally from carriage of one to two passengers and from two to three or more passengers for all young drivers under age 25 years irrespective of licence type (Lam, Norton, Woodward, Connor & Ameratunga, 2003). In WA it was found that passengers tend to ride with drivers of a similar age (Adams, 2003a). Drivers who were licensed for one year or less were eight times more likely to be involved in a fatal passenger injury crash than drivers for more than one year. Moreover, passengers of these drivers were 13 times more likely to be injured than those with drivers licensed longer, and 17-20 year-olds were the largest passenger group injured.

There are several reasons why the presence of passengers might increase crash and injury risk¹. In terms of crashes, passengers can provide additional distractions to the driver, increasing their cognitive load and reducing their ability to attention share with important driving tasks and, especially for young drivers, can sometimes encourage drivers to undertake more intentional risk-taking, such as speeding (Regan & Mitsopoulos, 2001; Rice et al, 2003a; Williams & Ferguson, 2002; Williams, Preusser & Ferguson, 1998; Young, Regan & Hammer, 2003). Given an increased risk of crash involvement, the greater number of vehicle occupants increases the opportunity for injuries and fatalities to occur. Research examining fatal crashes has found changes in rates due to occupancy as well as changes in driver behaviour (McKnight & Peck, 2002; Rice et al, 2003a; Williams & Ferguson, 2002). Nonetheless, with sophisticated statistical techniques, Rice et al (2003a) examined the effects of passengers independent of vehicle occupancy. They found that driving without a supervisory driver was strongly related to increased crash rates for young (16-17 year-old) drivers carrying passengers. Young drivers were much more likely to cause a crash when driving alone than when supervised, and this risk was even greater with the addition of peer passengers.

Passenger restrictions are less commonly found in GDLS models than night-time driving restrictions and there are relatively fewer evaluations of their effectiveness. Restrictions of all passengers or peers, or limits of one only are currently included in 22 US GDLS models and in New Zealand (Begg et al, 2001; IIHS, 2004). Other US variations include limiting Provisional drivers to two or three passengers or peers. In Canada, only one jurisdiction (Yukon) includes a peer passenger restriction (IIHS, 2003). Without supervision, Provisional

¹ Note that passenger roles can greatly differ based on age, gender and relation to the driver, which in some cases can be beneficial (see Regan & Mitsopoulos, 2001; Rice et al, 2003a). Only global data is addressed here.

drivers are limited to carrying only one peer passenger (13-20 year-old) in addition to only one passenger under 13 years.

Only two jurisdictions were found to have published evaluations specifically addressing these restrictions, namely California and New Zealand. California introduced passenger restrictions in July 1998, restricting Provisional drivers from carrying passengers under the age of 20 years in the first six months, unless a fully-licensed supervisor aged 25 years or older is present (Hedlund & Compton, 2004). During the second six months, the restriction applies only from 12 am to 5 am. In New Zealand, novice drivers are restricted from carrying passengers under the age of 20 years, unless they are dependents, a spouse or qualify as a supervisory driver for the entire 18-month Provisional period (Begg et al, 2001).

A preliminary evaluation of the effectiveness of California's passenger restrictions compared fatal and injury crashes between 16 year-old drivers, to whom the restrictions applied, and 18-19 year-old drivers, who were not affected by the new restrictions, and their passengers (Mayhew, 2000). Comparisons were made one year prior and 11 months following introduction of the restrictions. It was found that the number of fatal and injury crashes for 16-year old drivers declined by 20% whereas for 18-19 year-old drivers the number increased by 6%. Moreover, the number of fatalities and injuries of peer passengers of 16-year old drivers declined by 21%, whereas for passengers of 18-19 year-old drivers there was a 5% increase. It was concluded that the reductions for 16 year-old drivers and their peer passengers was a result of the newly-introduced licensing changes, although results were considered to be preliminary due to the short time lapse since the new system was put in place (Mayhew, 2000).

An article in press, however, confirms these earlier positive findings (Cooper et al, in press). Cooper et al (in press) demonstrate that the Californian GDLS has led to reductions in peer passenger carriage by 16 year-olds, that is, in compliance with the regulations, and in both at-fault and not-at-fault young driver peer passenger crashes. In contrast, no differences were found for 20-24 year-old drivers.

More recent research has concluded a sudden and permanent reduction of 2.5% of 15-17 year-old driver crashes involving passengers has been achieved (Masten & Hagge, 2003). While this is a positive but small reduction, there was also some indication that 18-19 year-old drivers had delayed licensure until the restrictions did not apply to them, which may have limited the extent of the effectiveness of the restriction. Notably, ensuring GDLS requirements and restrictions apply to all new drivers would avoid this potential confounder.

As noted earlier, New Zealand was the first country to implement passenger and night-time driving restrictions back in 1989. At that time, the restrictions applied only to novice drivers aged 25 years or younger; however, since May 1999, the restrictions were broadened to apply to all novice drivers (Begg et al, 2001). Begg et al (2001) evaluated the effectiveness of the restrictions, although a full evaluation was not possible as data on passenger age was not available for non-injured passengers in vehicle crashes. They reported that a significantly reduced proportion of (total) crashes occurring with passengers of all ages was experienced after the introduction of the GDLS; however, there was no such decline in the equivalent number of crashes resulting in passenger injuries. Moreover, it was found that post-GDLS novices were just as likely to be carrying peer passengers as pre-GDLS novices, indicating a problem with compliance was likely to have contributed to the latter non-significant finding. Nonetheless, the researchers recommended that passenger restrictions should be given serious consideration by any jurisdiction developing a GDLS. Since that

time, as noted for night-time driving restrictions, Begg and Stephenson (2003) have stressed that, since the introduction of New Zealand's GDLS, both the number and rate of serious injuries and fatalities of 15-24 year-old vehicle occupants have nearly halved and there is little doubt that the GDLS restrictions have been the most important contributing factor.

Concern has been raised that the introduction of passenger restrictions could result in an increase in novices driving separately (rather than travelling together), increasing their exposure and, therefore, their crash risk (Drummond, 1994; Staysafe, 1998). The concern of elevated risk is further compounded by the likelihood that such increased exposure is likely to be more concentrated at night, when young drivers are more likely to be driving recreationally. IIHS (1999) examined this concern and concluded that, even with an increase in novices driving alone, there would still be a substantial reduction in fatalities. The study estimated that, even if compliance rates were as low as 20%, an estimated 9% reduction in fatalities would occur. With 100% compliance, a 38% reduction in fatalities was estimated.

Comparable reduction estimates were reported by Chen et al (2001) when examining this issue for 16-17 year-old drivers carrying passengers under 20 years of age. They predicted that, if this group was required to drive alone and their passengers were forced to drive alone or with drivers older than 18 years of age, there would still be a substantial reduction in crash fatalities. The estimated reductions in road user fatalities (including pedestrian, motorcycle and bicycle fatalities) according to varying compliance levels are presented in Table 3.7.

Table 3.7 Estimated reduction in fatalities for novices affected by passenger restrictions

Compliance rate	Reduction in fatalities
20%	7%
50%	22%
70%	23%-29%
90%	31%-42%

Notably, Chen et al (2001) did not directly examine alcohol-related crashes among these figures; most likely as the driving age is younger than the legal drinking age in the US. In Australia however, there can be an overlap between the Provisional driver age and legal drinking age. This raises the concern that peer passenger restrictions run counter to designated driver campaigns and might result in more alcohol-related fatalities. Nonetheless, Chen et al examined all road user fatalities, thereby including any alcohol-related fatalities, and found crash reductions over and above any increases in crashes resulting from novices driving alone or with older, non-restricted drivers.

The designated driver recommendation itself is a problematic one in relation to young drivers, given their greatly increased risk with multiple passengers (arguably particularly likely if those passengers are drunk and rowdy), and as such driving is likely to be taking part during the high-risk night-time hours. Moreover, young people often do not apply the designated driver strategy effectively, especially young males (e.g. Barr & MacKinnon, 1998; Timmerman, Geller, Glindemann & Fournier, in press). Barr and MacKinnon (1998) examined the frequency of designated driver use among US college students and reported that 94% of those surveyed indicated that their designated drivers had consumed alcohol.

In addition, 14% reported selecting their designated driver based on the person who was most sober at the time of driving. Many young designated drivers still consume alcohol and research suggests that they tend to make inaccurate judgements of drunkenness when applying rules about number of drinks and consumption time, both in themselves and for others (Foss, Holladay, Bartley & Marchetti, 2000; Turrusi, Jaccard, Kelly & O'Malley, 1993).

Interestingly, the research conducted by Chen et al (2001) provided support for the notion that passenger restrictions were likely to be more effective than night-time driving restrictions alone. While they found that the incidence of fatal driver crashes increased with the number of passengers both during the day and at night, more than half of the fatal crashes occurred during the day. The introduction of a peer passenger restriction could, therefore, potentially affect a greater proportion of passenger-involved crashes, reducing both novice driver and passenger fatalities. NHTSA (2000) also argue that passenger restrictions would be further enhanced if introduced in combination with a night-time driving restriction. Together these restrictions encourage Provisional drivers to continue to gain driving experience solo or with a supervisory driver in conditions that present lower crash risk.

Overall, the benefits of passenger restrictions are somewhat less clearly confirmed in the few existing evaluations compared to night-time driving restrictions; however, they are still considered highly effective by expert researchers in this field, particularly as they apply all day and night, rather than for a short period only. In particular, peer passenger restrictions are recommended given the large proportion of time that young people spend driving in their presence and the over-involvement of peer passengers in crash statistics (i.e. in addition to the drivers).

Local research can further direct recommendations on the scope of restrictions to introduce in a given jurisdiction; for example, could restrictions to one peer passenger only, or restrictions on passengers at night only be more appropriate? What exemptions should apply? Preliminary research in Victoria suggested the increased risk with one additional passenger was similar for young drivers than more experienced drivers, and that carriage of more than one passenger was greatest during night-time hours; however, passenger age could not readily be determined from the Police-reported crash data used (as is also true in WA equivalent data) in order to explore peer-only passenger effects (Cavallo, 2003). Williams and Ferguson (2002) report that, in the US, increased crash risk associated with passenger carriage exists for both day and night-time hours in about the same proportions; however, overall crash rates are much higher at night. They report on research demonstrating this increased risk, with one study finding driver fatality rates between 10 pm to 6 am were 1.74 times greater with passengers present than without passengers.

3.6.4 Vehicle power restriction

Victoria is the only jurisdiction in Australia (and elsewhere) to impose a high-powered vehicle restriction on Provisional drivers. Early research on this issue showed some indication that first-year drivers are at a greater risk of having a casualty crash in a vehicle of more than 150 BHP than a similar driver in a vehicle less than 150 BHP (Drummond & Healy, 1986). It was therefore believed at the time of its introduction that reducing the power of vehicles driven by new drivers would result in a reduction in crash risk.

Since that time, Drummond (1994) has argued that a vehicle power restriction only provides a crash reduction of less than 2% and then only for a small number of young drivers who

would normally drive these vehicles; provided their crash risk does not transfer with them to other vehicles. Furthermore, Mayhew and Simpson (2001) concluded that there are no studies that provide evidence to support such restrictions. At a recent young driver expert workshop, Ferguson (2003) confirmed that there was still little evidence of benefits of a restriction.

Anecdotally, the vehicle power restriction is not well-known or publicised, Police report that it is difficult to enforce (e.g. similar vehicles may have different engine sizes) and many vehicles that are not restricted are still sufficiently powerful to allow young drivers to lose control of the vehicle. Unless these issues can be addressed, this component is unlikely to be successful if introduced elsewhere.

Political and social factors may provide an impetus for introducing this measure, despite its lack of demonstrated effectiveness. Speed remains a major contributor to injury crashes in WA (Legge, Gavin & Cercarelli, 2004). It is likely that there is a public perception, particularly reinforced by the media, that restricting novices from driving high-powered vehicles will help limit the incidence of crashes involving excessive speed. Certainly, there have been no counterproductive findings regarding this component.

3.6.5 Warnings, stricter penalties, good driving record and lower demerit point threshold initiatives

A key element of the concept of GDLS is to motivate novices to drive safely. Strategies that aim to achieve this include issuing warning letters for early errors, increased penalties for Provisional offences, requiring a good driving record before graduation to full licence and lowering the demerit point threshold relative to fully-licensed drivers.

Forsyth et al (1995) found that novice drivers who were either booked or received a warning for an offence were more likely to be involved in crashes than other novice drivers. For those receiving warnings, crash liability was 39% higher, while for those booked with offences, crash liability was 66% higher.

In WA, first-year drivers have been found to have far greater risk of being involved in a crash and of incurring a traffic infringement and (court) conviction (Palamara, Legge & Stevenson, 2001). Moreover, infringements and convictions were predictive of crash involvement, and infringements alone were predictive of serious injury crashes for these drivers.

Requiring an offence-free period, increasing penalties for serious offences and lowering the demerit point threshold are all initiatives that aim to deter young drivers from driving in a manner associated with high risk of a crash and injury outcome. These initiatives are particularly important in addressing speeding behaviour. Drink-driving is visibly addressed in GDLS models that mandate recommended zero or low BAC limits. In contrast, reduced maximum speed restrictions are not recommended as part of GDLS models (see Section 3.7.4) and without these the GDLS may appear not to specifically target speeding behaviour. Therefore, these penalty-related initiatives are particularly important. A high level of awareness and understanding of their role and the behaviours they target is likely to enhance their effectiveness.

Warning letters

Warning or driver improvement letters are seen as a low-cost intervention targeting potential high risk drivers via a threat of more severe intervention, such as licence suspension. They are also important to impart knowledge to drivers of the demerit point system, encouraging them to drive more responsibly (Victorian Parliamentary Road Safety Committee, 1994). A study of the use of these letters in Oregon was conducted by Jones (1994). While the crash reduction effects identified were small, letters were concluded to be a very cost-effective option. The content of the letters was also found to be important. Standard letters of a high threat content that provided details of the offence that prompted the warning were found to be more effective than 'soft sell' letters.

Increased penalties for offences

The aim of increased penalties for driving violations is to provide a disincentive for young people to disregard the conditions of their licence and, therefore, improve compliance with restrictions (Begg et al, 2001). An important factor in motivating high compliance is a perception that a high risk of detection exists and that penalties for offences are high enough to discourage aberrant behaviour (Cameron & Sanderson, 1982).

Baughan and Simpson (2002) suggest that drivers who commit traffic offences such as speeding, and running red lights have a higher crash risk due to several factors, including:

- increased potential to come into conflict with other road users;
- reduced time to react to hazards;
- increased mental workloads;
- reduced predictability of their behaviour for other drivers; and
- increased likelihood that the consequences of their errors will be more severe.

New Zealand has increased their penalties for novices only recently (1999); however, an evaluation of the effectiveness of this initiative has not yet been determined (Begg et al, 2001).

Good driving record requirement

A GDLS component used by some jurisdictions is to require novice drivers to demonstrate that they can drive safely before being granted a full licence. Evidence of safe driving is a record that excludes traffic violations and sometimes crashes by the licence holder for a stated period. In the US, the University of North Carolina Highway Safety Research Centre (1996) have recommended that a Learner driver should have 12 consecutive violation-free months, and Provisional drivers six months, before being eligible to proceed to the next GDLS stage. Tannahill and Smith (1990) indicate that in Ontario, where novice drivers require two years driving without a suspension, there were 9% fewer crashes and 14% fewer offences for this group.

McKnight et al (1983, cited in Baughan & Simpson, 2002) evaluated Maryland's GDLS inclusion of a six-month violation-free requirement to progress to full licensure. Analysing crash data for the years 1975-1982, McKnight et al found a 10% reduction in convictions for traffic offences of 16 year-old drivers and a non-significant reduction of 5% for 17 year-old drivers. In 1999, Maryland increased its good driving record requirement from six to 12

months. Later, McKnight and Peck (2003) attributed the good driving record requirement in Maryland as responsible for significant reductions in crash and traffic violations.

Haworth (1994) has pointed out that graduating through a licensing system based on time is not as effective as a motivator of safe driving than graduation based on driving records, for which motivation to drive safely can be encouraged by making the driving record the key factor in removing restrictions. Notably, Waller (1993) suggested that, while a threat will not address the issue of inexperience, it might help deter deliberate high-risk behaviour, such as speeding, which is under the violator's control. Waller suggested, therefore, that additional penalties, such as licence suspension or extension of the GDLS restricted period, should focus on volitional risk taking rather than errors due to inexperience. From another perspective, the lifting of increased penalties in subsequent GDLS stages can be viewed as a reward for good driving. Particularly if sanctions keep young drivers from progressing to the next licensing stage with their peers (NHTSA, 1998), the requirement of a good driving record and the possibility of progression to more relaxed penalties can, therefore, provide an incentive to drive safely as a reward rather than solely as a threat.

Lowering of demerit point thresholds

In Australia and some North American jurisdictions, a common alternative to a good driving record requirement per se is use of a demerit point system for all drivers with a lower threshold for Provisional drivers. Demerit points are accumulated (or in some systems deducted) for traffic offences, with the number of points allocated being greater for offences of greater severity and greater road safety consequences. If a driver exceeds the maximum number of demerit points, a licence suspension/cancellation results. By reducing this maximum number for Provisional drivers, the initiative aims to act as a deterrent to committing traffic offences and to encourage young drivers to take greater care when driving.

Demerit point initiatives have generally been found to have a positive road safety benefit. Zaidel (2002) evaluated eleven studies that looked at the effects of demerit points, warning letters and licence revocation. The evaluation found all three measures led to significant crash reductions. Their combined effect was an overall crash reduction of about 12% and a reduction of fatal and injury crashes of about 17%. The use of warning letters and licence revocation were found to have crash reduction effects of 15% and 17% respectively.

Diamantopoulou, Cameron, Dyte and Harrison (1997) examined the predictive value of demerit points, in combination with other offence data, in determining crash likelihood in Victoria. The number of demerit points accrued did in fact predict driver crash involvement. Notably, for the highest scoring 1% of drivers, the estimated risk of their crash involvement was 4.4 times higher than that of all crashed drivers. While demerit points therefore can predict crash involvement, the best predictor included both demerit points and prior casualty crashes.

Several jurisdictions, including all but two Australian jurisdictions, New Zealand and several Canadian jurisdictions, have lowered their demerit point thresholds in recent years (Baughan & Simpson, 2002). Within Australia, there is a nationally agreed scale of exchangeable points and offences and points are exchangeable between jurisdictions. That is, points apply to the driver regardless of the state or territory in which the violation was incurred and are recognised in all Australian jurisdictions.

Note that as recently as March 2004, New South Wales lowered its demerit point threshold further for Provisional drivers from an already reduced threshold (Roads and Traffic Authority, 2004a). The threshold was reduced from four points to three points only during the 12-month Provisional Phase 1 period, and from seven points to six points only during the subsequent 24-month Provisional Phase 2 period. Their website states that the “demerit points system is designed to encourage safe driving. Coupled with financial penalties, demerit points have proven to provide a strong incentive to drive within the law.”

3.6.6 Extension of Provisional period following licence suspension

In addition to mandating a sufficiently long Provisional period, it is necessary to ensure other GDLS features do not work counter to this initiative. The inclusion of licence suspensions without adjustment to the length of the Provisional candidature effectively shortens the period available for lower-risk driving experience for the very novices for whom the restricted licence is most befitting. For example, a suspension that prohibits the novice from driving for three months without adjustment to a two-year minimum Provisional licence would result in only 1 year 9 months of legal driving experience. Therefore, it can be seen that licence suspensions on their own can work contrary to GDLS objectives.

This is not to suggest suspensions should be excluded. They are likely to play an important motivational role for many novices and encourage safer driving when the licence is reinstated. Rather, it is recommended that the length of the suspension should be added to the length of Provisional licensure (Waller, 1993). This initiative aims to ensure that all novice drivers spend the same amount of time gaining experience in lower-risk conditions on the restricted Provisional licence before proceeding to a full, unrestricted licence.

Notably, prior to its introduction of a reduced demerit point threshold for Provisional drivers (effected in December 2003), Victoria not only added the length of a suspension to the Provisional licence candidature, but for some more serious offences an additional six months extension also applied. In addition, when these drivers returned to driving they were restricted to carrying one passenger only – the only Australian jurisdiction to have some form of passenger restriction, albeit different to the more common applications discussed in Section 3.6.3. These initiatives were not linked into the demerit point process and, therefore, were effectively lost. Currently, Tasmania’s GDLS is now the only model that includes extensions of the Provisional period following suspensions. Moreover, if a serious offence leading to suspension occurs in the first year of Provisional driving, the licence is cancelled and the driver must be reapply following the suspended period.

In Western Australia, there is no system of suspension of Provisional licences. If a Provisional licence holder commits specified offences, their licence is cancelled. In the case of a cancelled Provisional licence, the holder is required to sit and pass the practical driving assessment after the period of disqualification to regain their licence. The provisional period is halted for the period of their disqualification and restarts when they regain their licence. For example, if a driver is disqualified for 3 months, one year after obtaining his Provisional licence, then he can get his Provisional licence back following the 3-month cancellation and will have one year remaining on his Provisional licence. Thus the total time elapsed from initial licensing to the completion of the Provisional period will be 2 years and 3 months.

Learning from the Victorian example, when structuring differential penalty and demerit point systems for Provisional drivers, there is a need to consider how any changes can potentially compromise the extent of experience they gain in lower-risk conditions. Extending the Provisional period by the length of any periods of suspension or disqualification will ensure that high-risk drivers are subject to Provisional restrictions at least for the standard length of time mandated for all drivers.

3.7 Effectiveness of components of both the Learner and Provisional periods

3.7.1 Age-based exemptions from restrictions

In some jurisdictions, such as New Zealand and all Canadian provinces, GDLS requirements and restrictions apply to all new drivers irrespective of age, whereas most GDLS models in the US only apply to those under 18 years of age (Simpson, 2003). Driver age alone is related to novice driver crash risk, such that risk decreases as age increases (e.g. Maycock et al, 1991; Williams & Ferguson, 2002). However, the higher crash risk found for newly-licensed drivers is generally more attributable to inexperience than age (e.g. Maycock et al, 1991; e.g. Mayhew et al, 1999).

Maycock et al (1991) demonstrated this relationship, based on UK research. Drivers who delayed first licensure from 17 years of age (the minimum age for licensure) to 18 years experienced a 6% lower crash risk. However, regardless of what age drivers are first licensed, the first year of experience results in about a 30% reduction in crash risk.

Mayhew et al (1999) found a similar pattern in Nova Scotia following the introduction of their GDLS. Among 16 year-old drivers, a 24% decrease in crashes was found for the first year of the GDLS, and a 37% reduction over the first three years. However, while recognising that 16 year-olds comprised the majority of novice drivers, the overall finding was that the crash rate¹ reduced by 19% for all novice drivers.

Staysafe 37 (1997) recommended that GDLS restrictions apply to all novice drivers due to the difficulties in separating the combined effect of age and inexperience. Maryland included this requirement in its GDLS to overcome criticism that age-based methods may appear to be discriminatory. Not permitting GDLS requirements to be exempted on the basis of age reinforces the message that all new drivers need a long enough period to gain essential driving experience.

As noted earlier, there was some indication, that age-based exemptions for restrictions once 18 years of age or older in California had led to some 18-19 year-olds delaying Provisional licensure until that age when night-time driving and peer-passenger restrictions no longer applied (Masten & Hagge, 2003). While delayed licensure is one way to improve safety, these drivers are still inexperienced and can still benefit from such GDLS requirements and restrictions that reduce their exposure to higher-risk situations while they are gaining early unsupervised experience. Therefore, setting minimal age-based exemptions that may delay licensure for some drivers is unlikely to provide benefits over and above those achieved with a full range of Provisional restrictions.

¹ per 10,000 licensed novices

3.7.2 Zero BAC limit

A zero BAC limit has been recommended in North America (Williams & Mayhew, 1999), in the European Union (Bartl, 2000) and Australia (Haworth, 1994). Earlier it was shown that many Australian jurisdictions have mandated a zero BAC limit for both Learner and Provisional drivers. Canadian provinces with a GDLS in place (British Columbia, Nova Scotia, Ontario) also include a zero BAC limit, as well as Oregon in the US. Many GDLS models in the US, like two Australian jurisdictions, mandate a 0.02% limit (e.g. Florida, Kentucky, Maryland, Michigan, North Carolina), as does Sweden. Notable exceptions to these are a 0.01% BAC limit in California and a 0.03% limit in New Zealand. While restrictions exist above zero, therefore, the reduced BAC level is still aimed to discourage novice drivers from drinking before driving and is often referred to as a 'zero tolerance' (Shults, Elder, Sleet, Nichols, Alao, Carane-Kulis, Zaza, Sosin, Thompson & the Taskforce on Community Preventive Service, 2001).

Notably, in 1995, the US Congress introduced an act to require all states to implement a BAC limit of 0.02% or less for all drivers under 21 years of age by October 1998 or risk losing federal highway construction funding (Shults et al, 2001). By July 1998, all 50 states had enacted lower BAC laws. Based on US and Australian research, Shults et al (2001) report clear benefits of the reduced BAC initiative, finding reductions in fatal crashes in the order of 9-24% following implementation of the initiative.

The effectiveness of the stricter limit of zero BAC compared to other low and higher BAC limits has also been examined. Zwerling and Jones (1999) assessed six studies that analysed fatalities and injuries of drivers from four Australian states (Queensland, Tasmania, Victoria, WA) and three US states (Maine, Maryland, Massachusetts) with varying BAC limits of zero, 0.02%, 0.04%, 0.05% or 0.06%. Participants were drivers involved in either serious or fatal crashes, ranging in ages from 15-21 years. They found that jurisdictions with a zero BAC restriction, on average, experienced a 22% reduction in night-time single vehicle fatalities after the implementation of the restriction. Jurisdictions with a 0.02% BAC limit had an average 17% reduction while for jurisdictions with a BAC limit between 0.04% to 0.06% the corresponding average reduction was 7%. Therefore, the lower the BAC restriction, the higher the reduction of young driver injuries and fatalities; even between the 'zero tolerance' level of 0.02% to zero.

There is now an established body of research that shows that the increased risk associated with increasing BAC level is larger for young drivers than other drivers (Keall, Frith & Patterson, 2001, 2004; McLean, Holubowycz & Sandow, 1980; Zador, Krawchuk & Voas, 2000). Early research by McLean, Holubowycz and Sandow (1980) found that young drivers were more affected by alcohol than older drivers and their crash risk for low levels of BAC was relatively high compared to older drivers. Recent New Zealand research has shown that drivers in their 20s have more than five times the risk of drivers over 30 years of age at all BAC levels (Keall et al, 2004). In addition, New Zealand research estimates that each additional 0.02% increment in BAC level increases driver fatal crash risk and that this increase is larger for teenage drivers than other drivers, such that their fatal crash risk doubles for every 0.02% increment (Keall, Frith & Patterson, 2001). Moreover, this differential risk is inflated further at night and with every additional passenger (Keall et al, 2004). The researchers conclude that the current 0.03% BAC limit for New Zealand novice drivers (and 0.08% limit for young, fully-licensed drivers) compromises safety and requires policy change and public education.

Notably, as recently as May 2004, New South Wales reduced a previous BAC limit of 0.02% for all Learner and Provisional drivers to a zero BAC limit. The Roads and Traffic Authority of New South Wales states on its website “The zero alcohol limit has been introduced for novice drivers because they are more vulnerable to the effects of alcohol than experienced drivers due to their newly developing driving skills” (Roads and Traffic Authority, 2004b).

3.7.3 Mandatory seat-belt use

It is widely accepted that consistent use of seat-belts in motor vehicles reduces substantially the incidence of fatalities and serious injuries due to crashes (e.g. Evans, 1996; Petridou, Skalkidou, Ioannou, & Trichopoulos, 1998; Robertson, 1996; Shibata & Fukuda, 1994). Victorian research has found that in 1997 approximately 20% of car occupants killed were not wearing seat-belts (VicRoads, 1998). It was estimated that the relative risk of being killed in a crash was four times greater for unbelted compared to belted occupants. A 1996 European Traffic Safety Council report (cited in Zaidel, 2002) suggested that if every car occupant in the EU in 1996 had used seat-belts (when front seat usage was only 75-80%), then approximately 10,000 of 25,000 recorded fatalities would have been saved.

Given these statistics, the need to increase seat-belt use is an understandable priority for many jurisdictions, reflected in the introduction of mandatory seat-belt legislation in jurisdictions worldwide (see Meehan & McGinnis, 1999). Based on data from 13 countries in Europe, research has also found that introducing a GDLS seat-belt requirement (and related enforcement) is associated with increased usage (between 24% to 64% increase in the first year of introduction) (Stepto, Wardle, Davidsdottir, Davou & Justo, 2002).

Australia, where seat-belt use is regulated for all drivers, has one of the highest wearing rates in the world (Cammisa, Williams, & Ferguson, 2000; Diamantopoulou, Dyte, & Cameron, 1996). Moreover, Victorian research suggests that drivers who do not wear seat-belts do so only in some circumstances rather than at all times (Harrison, Senserrick, & Tingvall, 2000).

Victorian research has found that seat-belt use by drivers aged 18-21 years was as high as 99.7% (Diamantopoulou et al, 1996). The wearing rate for 18-25 year-old passengers was also high, although somewhat reduced at 98.9% for front seat passengers and 94% for rear seat passengers. However, a more recent observational study in Victoria, suggested somewhat lower rates than these for metropolitan drivers (Whelan, Diamantopoulou, & Senserrick, 2003). Drivers estimated to be aged between 18-21 years had a seat-belt wearing rate of 95.3%, but for their passengers only 89.1% were correctly restrained. Therefore, there is still a need to increase seat-belt usage by novices.

Notably, Williams and Shabanova (2002), in a study of US drivers, found that seat-belt use was lower for drivers of all ages at night and when alcohol was present. Moreover for young drivers, seat-belt use decreased with increasing number of passengers and was lowest when passengers aged 20-29 years were present. A number of US jurisdictions, such as North Carolina, now include a GDLS requirement that all vehicle occupants (both novice drivers and their passengers of all ages) must wear seat-belts (Baughan & Simpson, 2002).

3.7.4 Maximum speed and freeway restrictions

Speed and freeway restrictions are generally implemented based on several assumptions, namely, that lower speeds (Doherty & Andrey, 1997; Mayhew & Simpson, 1990; Roads and Traffic Authority, 2000):

- provide inexperienced drivers with additional time to react to cues and recover from mistakes;
- reduce the severity of a crash;
- allow drivers to gain experience in less challenging conditions; and
- can aid development of long-term behaviour that encourages driving at lower speeds.

In Ontario, where Learners are restricted from driving on freeways, Boase and Tasca (1998) found a 61% reduction in freeway crashes by all Learners. A 22% reduction for 16-19 year olds (38 crashes down from 48 pre-GDLS) contrasted greatly with the 96% reduction for 20-24 year olds (4 crashes down from 96), suggesting that the youngest Learners were perhaps less likely to comply with the restriction. (Note that the Learners are not required to display L-plates.)

Doherty and Andrey (1997) point out, however, that there are additional safety features associated with driving on high speed roads (100 km/h) when compared to metropolitan and feeder roads that make these roads safer for all drivers. They found that restricting young drivers from high-speed roads was associated with a 5% increase in their (total) crash involvement. Doherty and Andrey suggested this occurred due to a transfer of travel to lower-speed roads, which, in effect, diverted traffic away from the safest roads to comparatively more dangerous roads.

Speed restrictions can also restrict both rural and metropolitan Learner drivers from gaining experience on country roads (Staysafe 37, 1997). It was suggested that a better way to minimise the concerns held towards speed for Learners would be to require that driving commence on low speed roads and then progress to high speed roads once Learners acquired sufficient practice.

Until 1988, Victoria had a requirement that novice drivers could not exceed 80 km/h in their first year of being licensed (VicRoads, 1988). After Victoria removed this restriction, an evaluation was conducted that found no evidence that the removal of the limit led to an increase in Provisional driver crashes (VicRoads, 1988). The evaluation found that there was no increase in crash involvement for drivers who would have been restricted previously and, specifically, no increase in the proportion of fatal or serious crashes on roads with speed limits above 80 km/h. Two main factors were identified as likely contributing factors to this finding:

- Poor compliance with speed restrictions by Provisional drivers. (Different speed requirements by drivers were also difficult to program for enforcement/detection by speed cameras or stationary speed detection methods.)
- Speed dispersion, whereby a vehicle travelling at a much slower speed than the prevailing traffic stream elevated crash risk (increasing the incidence of crashes on high speed roads).

It is noted that Bartl (2000, 2001), consistent with Staysafe 37 (1997), reports that the recommendations of a European Union review of novice driver initiatives also advised against the introduction of differential speed limits for novice drivers. However, some Australian jurisdictions (NSW, NT, SA, TAS), Canadian jurisdictions (British Columbia, Newfoundland, Ontario), and European jurisdictions (Northern Ireland) require Learner permit and/or Provisional licence holders to drive at lower speeds than posted limits (e.g. 80 km/h in a 100 or 110 km/h speed zone). At a recent young driver expert workshop,

Ferguson (2003) confirmed that there was still little evidence of benefits of maximum speed restrictions.

3.7.5 Towing restrictions

In 1992, Staysafe 22 reported that at least 1-2% of fatality crashes in New South Wales involved a vehicle towing a caravan or trailer. Concerns were raised regarding towing skills, particularly, the ability to overtake other vehicles safely. It was noted that, while some drivers may frequently tow trailers or other vehicles, it was likely that most other drivers do so only occasionally. Consequently, Staysafe 22 provided guidelines for correct use of towing equipment and complementary education and licensing regulations.

While several jurisdictions include a GDLS towing restriction on Learner drivers and/or Provisional drivers (e.g. ACT, NSW, TAS, VIC & WA), the road safety effects of this restriction are generally unknown. Investigations on whether compulsory testing or licensing was necessary for towing were conducted by the House of Representatives Standing Committees in 1982 and 1986 (Staysafe 22, 1992). In 1982, there was insufficient evidence for such a requirement. In 1986, however, it was suggested that the feasibility of introducing a separate licensing test for drivers for towing caravans over a certain weight or length should be considered to ensure adequate knowledge and driving skills.

On the one hand, it can be argued that towing restrictions for Learner and Provisional drivers allow them to maximise the development of general driving skills before adding to their cognitive/skill workload with the additional demands associated with undertaking a new and complex task such as towing. On the other hand, as argued for other GDLS initiatives, undertaking this task while supervised by an experienced driver provides the opportunity to develop towing skills in lower-risk conditions. However, there is a clear distinction between towing and other restricted behaviours, such as driving at night, with peer passengers or on high-speed roads. The latter are likely to be frequent, even daily aspects of driving and, therefore, well-practised. In contrast, towing is generally an infrequent activity and, therefore, even an experienced driver of several years may not have a well-developed understanding of the skills involved to provide adequate guidance for an inexperienced driver. If unrestricted during the Provisional licence phase, a novice without any previous experience during the Learner period is able to undertake this task unsupervised.

In all, therefore, there is no conclusive support for or against towing restrictions in GDLS models. Graduating restrictions from no towing to trailer weight restrictions and then removing restrictions provides opportunity for the added workload of the task to be gradually introduced with experience. However, there is no guarantee that towing will be undertaken or be well-practised in the earlier, restricted licensing stages.

3.7.6 Testing requirements

Tests or assessments are an important component of all GDLS models as they provide hurdles to graduate from one licensing phase to the next, encouraging increased driving experience and reinforcing the message that graduated licensing is a progressive learning process (Baughan, 2000; Siegrist, 1999). The main objective is increased safety, such that minimum standards must be met and those who lack the required competencies are not permitted to enter the system (Baughan, 2000; Simpson, 1995). Additional objectives concern fairness and efficiency of the system (Baughan, 2000). Most candidates who fail a

test simply undergo more practice and then take the test again so that in the end few drivers are screened out of the system (Mulvihill, 2002).

Overall, the main outcome of driver testing is to encourage drivers to undergo sufficient training and practice (Mulvihill, 2002). Goldenbeld, Baughan and Hatakka (1999) identify two main ways in which a driving test may influence training:

- The content of the test and the test standards directly influence the type, standards and amount of training and practice.
- The test itself may serve as training by indicating to “failed” Learners the areas in which they need further experience.

In addition to traditional on-road practical tests, testing used within GDLS models includes knowledge tests, hazard perception tests and exit tests.

Knowledge tests

Most licensing jurisdictions require applicants to pass a road law knowledge test in order to meet the initial GDLS requirements to obtain a Learner permit. The theory test may cover a wide range of topics including traffic regulations, behavioural rules, automotive engineering, behaviour in risky situations, attitudes towards the car and driving, behaviour of other road users, vehicle safety, vehicle maintenance, and recognition and avoidance of risky situations (Goldenbeld et al, 1999). Successful completion of the theory test is an important first step of GDLS as it allows the Learner to practice on the road within the framework of road law knowledge (Staysafe, 37, 1997). In some jurisdictions, theory tests similar to that for Learners are included as hurdles in other subsequent stages (Mulvihill, 2002).

Knowledge test requirements ensure that Learner drivers have a basic understanding of road laws and encourage pre-Learners to read safety material before entering the road environment. They also have high face validity within the community (Staysafe 37, 1997). However, there is also community concern that many drivers appear to have little knowledge of the road rules or choose not to apply them (Staysafe 39, 1998). Gregersen and Bjurulf (1996) point out that it is important not to neglect any problems due to poor knowledge because these gaps may lead to potential driving risks.

Jonsson, Sundström and Henriksson (2003) have recently evaluated licence testing practices across several EU countries. They conclude that theory tests used in Europe have problems with validity and reliability (see also Baughan & Simpson, 1999, regarding test reliability concerns in the UK). Several examples were addressed, including problems with: allowing a sufficient number of items for each topic area; allowing sufficient time for all or almost all applicants to answer items for which response rates are irrelevant; for multiple choice items, using stems that cover the problem completely and including a clearly correct response and equally attractive incorrect or distractor response options; ensuring the proportion of correct responses from response options is the same in different test versions; excluding items for which an unknown, multiple number of options is correct and all must be identified to accrue points (either partial points must be allowed or only one correct option included); having cut-off scores that vary by test and test components; and lacking items to assess attitudes associated with risky driving and crash involvement and higher-order factors, such as hazard perception and self-evaluation. Care should be taken to ensure test properties of the knowledge test are consistent with ‘best-practice’ guidelines.

Simpson, Chinn, Stone, Elliot and Knowles (2002) conducted a survey to assess the impact of Great Britain's revised theory test, which aimed to increase knowledge in the areas of driving regulations, traffic signs, signals and hazard awareness that would lead to attitudinal and behavioural changes, in turn, reducing crashes. A survey of novice drivers pre and post the introduction of this requirement found only a small effect on driver attitudes and behaviour, however, where differences were observed, they were consistent with a beneficial effect of the theory test.

There is not, however, an exact relationship between passing a road law knowledge test and actual driving performance (Baughan, 2000; Macdonald, 1988; Torpey, 1988). Nonetheless, some research has found that applicants who pass the knowledge test on the first attempt have significantly lower crash rates¹ in each of their first three years of unsupervised driving than those who needed more than one attempt (Maag, Laberge-Nadeau, Dionne, Desjardins & Messier, 1999). This suggests that initial test performance could be used to screen higher-risk drivers to enable interventions to occur (Hirsch & Maag, 2001).

On-road practical tests and assessments

On-road practical tests serve two primary functions (Baughan, 2000; Staysafe 37, 1997). They are a mechanism to induce Learners to accumulate driving instruction and experience and they ensure that minimum skills are demonstrable, such that unskilled drivers are screened for exclusion from the unsupervised driving population. Most GDLS jurisdictions require some form of on-road driving assessment (practical test or CBTA) to be passed in order to drive unsupervised.

On-road practical tests generally require demonstration of adequate skill in car control, adequate performance of basic and special manoeuvres and good understanding of traffic regulations (Goldenbeld et al, 1999). Current tests are generally skill-based and do not assess driver characteristics (such as propensity to speed and attitudes/motivations to take risks) and, due to the restricted conditions in which they operate, do not provide a good measure of hazard detection skills (Maycock, 2002; Mayhew, 2003). This reduces the likelihood that these tests will be effective in reducing subsequent crash risk, as behaviours assessed in the test do not directly determine subsequent driver behaviour.

Research has generally confirmed this assumption, finding little association between overall scores of on-road assessments and crash rates once licensed (Baughan, 2000; Maag, Laberge-Nadeau, Desjardins, Morin & Messier, 2001; Maycock, 2002). Maag et al (1999, 2001) reported, however, that while no association was found between performance on an on-road practical test (only) and subsequent crash involvement, females who passed both the knowledge and practical test on the first attempt experienced lower crash rates² than females who needed more than one attempt. This contrasts with a counterproductive outcome found for male drivers by Hatakka et al (2002). Hatakka et al found that the better that male drivers performed in an on-road practical test, the more often they were involved in crashes and traffic violations. They suggested these results were due to the emphasis of the tests on basic skills (which are essential for success in traffic) rather than driver attitude/motivation and driving style.

¹ per 30-day period per 100 licenced drivers

² per 30-day period per 100 licenced driver

Maycock and Forsyth (1997) have also found some associations between particular types of practical test errors and subsequent crash involvement. For instance, poor performance on low-speed manoeuvres and a higher number of attempts to pass the test were associated with an increase in subsequent crashes once licensed (particularly for females). In addition, the greater the number of minor errors that occurred during the test, especially errors of awareness and anticipation, the greater the crash involvement of the driver once licensed. Baughan and Sexton (2001) also found a strong predictive relationship between driving errors and crashes once the effects of mileage, age and driving in the dark (factors which were found to increase crash liability) had been removed. Baughan (2000) has suggested that changes to the test (such as lengthening it) to screen out drivers who make a large number of errors would be beneficial.

Maycock (2002) indicates that young drivers (particularly males) are faster, more aggressive, have a greater propensity to violate rules and react quicker (so leave smaller margins of error). This suggests that an on-road assessment would be beneficial if road safety attitudes as well as behaviours could be tested. These are, however, difficult to test, particularly as applicants are motivated to perform well and are likely to avoid responding unfavourably during an assessment. Baughan (2000) has suggested that, due to this potential for applicants to feign favourable attitudes, benefits may be restricted to providing an educational message to those of concern. Professional driving instructors are one such group that might target such education. West and Hall (1998) found that poor attitudes and high-risk drivers could be identified by driving instructors within the pre-licence instruction process.

Traditionally, most jurisdictions based their scoring systems for the practical test on a system where points are deducted for incorrect responses (Mulvihill, 2003). That is, examiners use a faults checklist and allocate scaled points against each specific fault and award a pass/fail based on the accumulated number of demerit points. Evaluations of these traditional licensing systems in Australia have shown that testing officers focused most of their attention on a small number of categories of faults rather than evenly dividing their attention on all potential faults (see also early review by Macdonald, 1987). However, an examiner cannot observe all aspects of the driver's performance at once (Mulvihill, 2003). For example, some responses involve examining a vehicle's position relative to other vehicles (e.g. gap judgement) or the roadway (e.g. lane keeping) while others involve watching the driver's hands (e.g. signalling) head movements (e.g. outside mirror checks), or eye movements (e.g. inside mirror checks) (McKnight, 1989). Given the wide variation in road and traffic conditions between test locations, there was also some concern that this system favoured applicants being tested in undemanding test locations.

In light of these limitations, a version of a test developed in the United States called the Automobile Driver On-Road Performance Test (ADOPT) (McPherson & Knight, 1981) was introduced in South Australia in 1992 and in New South Wales in 1993 (Mulvihill, 2003). Victoria and the Northern Territory have subsequently introduced ADOPT based testing in their licensing systems. ADOPT was designed to increase the consistency and reliability of results by testing applicants on specific behaviours, called performance checks, at specific points on a set route. The final score is calculated as a percentage of checks that the applicant demonstrated correctly compared to the total checks assessed. Therefore, correct behaviours are recognised as well as incorrect ones with the proportion of correct to incorrect errors determining the final outcome and not simply the total number of errors; an approach recommended by Jonsson et al (2003) in their review of EU systems. An improvement of the ADOPT approach is that it places greater emphasis on assessing higher

order cognitive skills such as decision making, search and space management skills. Less emphasis is given to the assessment of vehicle control skills. However, in Australia, those jurisdictions that use the ADOPT principles have continued to place more emphasis on vehicle control skills than on other skills (Staysafe, 39, 1997).

Drummond (2001) raised a concern that practical tests can encourage young drivers to focus solely on passing the test as the aim of the learning period. This focus risks many young drivers compressing much of their driving experience into a short time period just prior to the test, rather than having a gradual, systematic development of skills related to safer driving behaviour. Baughan (2000) has suggested that any changes to the test that encourage more pre-test experience would be beneficial.

A test focus by Learner drivers also has consequences for the driving instruction industry as Learners often approach driving instructors to teach them how to pass the on-road practical test rather than to teach them how to drive safely (Fitzgerald & Harrison, 1999). Instructors have a commercial responsibility to teach their students how to pass on-road assessments or risk losing their business. Baughan (2000) indicates that driver testing is a key way to influence both the competence of novice drivers, in terms of pre-driver instruction, and how they prepare for their test. To address this issue, British Columbia has legislation in place that prohibits driving schools to teach or allow a student to be taught the road test routes used by the Insurance Corporation of British Columbia without the Corporation's consent (Insurance Corporation of British Columbia, 2000). This has a dual aim, both to prevent instructors from only teaching novices how to drive these routes well and to reduce concerns of residents.

Of note, the Driving Standards Agency (2003) in the UK recently announced that the practical driving test would change to include a quiz on basic vehicle safety and car maintenance prior to undertaking the on-road assessment. Two questions would be added based on a "show me" and "tell me" format.

Hazard perception tests

The ability to identify potential hazards in a traffic environment and to respond to those hazards appropriately, and promptly when necessary, is an important component of safe driving. It has long been recognised that inexperienced drivers have poor hazard and risk perception skills compared to experienced drivers (Brown & Groeger, 1988; Mourant & Rockwell, 1972). This has led to several jurisdictions including hazard perception tests (HPTs) as a component of their GDLS testing (e.g. British Columbia, NSW, the UK, VIC & WA). The Insurance Corporation of British Columbia (ICBC, 2002) verifies that, whereas the Australian and British HPTs are computerised, British Columbia's HPT requires drivers to identify potential hazards aloud to the examiner in commentary style during the on-road practical test.

Victoria first implemented a HPT in 1996¹ for entry to Provisional licensure, in addition to the on-road practical test requirement. While originally intended as an exit test, given that hazard perception ability is related to driving experience, it was decided to include the test at this phase to encourage Learners to maximise their on-road driving experience before applying for a Provisional licence (Scott, 2002). The HPT was a computerised test that

¹ Victoria's first Hazard Perception Test was developed in 1989, piloted in 1994 and fully implemented throughout Victoria in 1996.

required the applicant to indicate when a nominated vehicle was safe to proceed (or not) in a series of short (seven second) video clips of traffic scenes.

An evaluation of the Victorian HPT by Congdon (1999) found that, novices with very low scores had higher crash involvement than novices with average and high scores, despite its very low psychometric reliability. Low psychometric reliability was considered to be due to the relatively short item duration and to some items eliciting responses that were inconsistent with the responses to other items. There was also a low pass requirement (less than 50%). A revised version was introduced in 2002, which included more items, longer response duration and a higher pass requirement.

HPTs must also be subject to the same careful examination required for theory tests; that is, to ensure their validity and reliability (as per Baughan & Simpson, 1999; Jonsson et al, 2003). There is a tendency to have a pass mark requirement well below 50%. This appears to be tied to concerns that the test should not be too restrictive such that “too many” people fail. If the purpose of the test is to measure a skill necessary for safer driving, it is contradictory to include it but not set a reasonable pass mark requirement (i.e. above chance level). On the other hand, if the purpose of the test is to encourage supervised driving experience, then a higher pass mark requirement might encourage more experience to be gained before attempting the test.

Exit tests or requirements

Exit tests or requirements aim to reinforce to novice drivers that the GDLS is a progressive learning process with various assessment hurdles before a full licence is issued and to establish that drivers have reached appropriate skill levels at each hurdle stage (Baughan, 2000). The rewards of meeting the hurdle tasks are relaxed Learner or Provisional licence restrictions.

Staysafe 37 (1997) expressed concern that, without an exit test to assess driving skills, Provisional drivers could graduate to a full licence without having driven significant distances or driven under a sufficiently wide variety of circumstances during a period of lower-risk conditions. Therefore, an assessment of on-road driving skills prior to being issued a full licence was recommended and, moreover, that the assessments should be conducted through a competency-based assessment procedure rather than a formal test over a prescribed test route. Notably, this concern is likely to apply only to a certain proportion of novices given that one factor in novice over-representation in crashes is their greater exposure compared to other driving groups (e.g. Arup Transportation Planning, 1995; Evans, 1991).

Mayhew and Simpson (1996) suggest that more frequent and demanding tests be introduced under GDLS. This would motivate novices to acquire and practice safe driving skills necessary to pass these tests. Failing the tests would demonstrate skill limitations. They suggested that these tests should be introduced earlier in the process and allow removal of some restrictions but not all before a full licence is issued. There is a rapid decrease in crash risk after the first few months of unsupervised driving (Mayhew et al, 2003a; McCartt et al, 2003), which makes it imperative to ensure that adequate tests are introduced early in the process (within the first six months of gaining a licence) in order to target the novice driver when their crash risk is highest. In this way, they can be viewed as performance-based entry tests as they ensure that the novice has acquired the skills to progress to the next licence stage.

New South Wales currently adopts this approach by including tests at each level of licensing. Passing a knowledge test is a pre-requisite for the Learner phase, passing an on-road practical test is required to progress to a first Provisional phase, a hazard perception test to progress to a second Provisional phase, and an exit test to graduate to full licensure. The exit test is described as a comprehensive test that combines an advanced hazard perception test with a knowledge testing of road rules and safe driving practice (Roads and Traffic Authority, 2002). This GDLS process was only recently introduced in 2000 and has not yet been evaluated.

A concern about the absence of an exit test from the Provisional licence phase to full licence is that it may give the impression that the novice is well experienced with driving, creating a false sense of safety when first driving unsupervised in higher-risk conditions. Recent Victorian research suggests this can be a difficult transition in adjusting to the relaxed restrictions, in particular, the change in BAC limit from zero to 0.05% (Senserrick, Hoareau & Diamantopoulou, 2002). It may be beneficial to include a marking of this transition, if not with testing then with additional education.

Note that while jurisdictions use an exit test (a practical test) to ensure that novice drivers have gained the necessary practical experience, this may not be necessary in those jurisdictions that require novices to gain a certain amount of practical experience before being issued with a full licence.

Retesting

NHTSA (1998) has indicated that delayed retesting after failure is a strategy for improving driver proficiency as part of the multilevel testing process, based on the assumption that applicants will study further to address their inadequacies. Baughan (2000) noted that if the cost of a retest was increased or a longer delay was specified before retesting was allowed, applicants might delay sitting the test until they were more prepared.

Some jurisdictions require applicants who initially fail their tests to wait for a specified period of time before undergoing retesting. For example, Quebec enforces a 30-day period (Maag et al, 2001). As mentioned previously, applicants who fail their knowledge test on the first attempt, or both knowledge and practical test for females, are more crash involved when first driving unsupervised than applicants who pass on the first attempt (Maag et al, 1999, 2001; Maycock & Forsyth, 1997). Delaying retesting for practical tests adds an extra 30 days to the Learner period, thereby, increasing the opportunity for more supervised driving experience under lower-risk conditions. Therefore, a delay can act as an intervention for potentially higher-risk drivers.

3.7.7 Education, instruction and training

Literature relating to the effectiveness of education, instruction and training initiatives in reducing crash and injury risk has been addressed in the previous chapter (Chapter 2), with Section 3.5.4 highlighting that such initiatives that lead to earlier unsupervised licensure, thereby increasing such exposure at an earlier age, are counterproductive. A brief discussion of other related theory and research specific to GDLS models is included here.

For Learner drivers, initial education and instruction has been found to be important in developing basic car control skills and knowledge of road laws, building public support of such laws and increasing motorists' perceptions of their risk of apprehension (Christie, 2001; IIHS, 2001b). The role of optional CBTA programs in this process is not yet clear.

A survey of South Australian Learner driving experience under CBTA was reported by Austroads (1999). Provisional drivers were surveyed at the time of licensing and responses compared to those who had opted for CBTA rather than undertake the on-road practical test option (Austroads, 1999). It was found that those who undertook CBTA were younger and had held their permit for a shorter period than those who opted for the practical test. They had also undertaken more professional instruction and less private supervised practice, experiencing a wider range of driving tasks and conditions under the professional instruction. This experience was also spread throughout the Learner period whereas practical test applicants mostly had professional lessons in the period prior to the test. Based on the literature, the younger age at licensing, shorter Learner period and lower levels of supervised practice are likely disbenefits of the program, while the wider range of driving conditions experienced in professional sessions is a likely benefit.

Overall, the development of safety-related attitudinal-motivational orientations is argued to be among the most beneficial skills for safer driving (Boase & Tasca; 1998; Gregersen, 1996a; Gregersen & Bjurulf, 1996; Hatakka et al, 2002; IIHS, 2001b; Woolley, 2000). The literature also identifies a number of other kinds of interacting (non-discrete) skills that need to be developed for safe driving (Congdon & Cavallo, 1999; Gregersen & Bjurulf, 1996; Mayhew & Simpson, 2002; Siegrist, 1999; VicRoads, 2002c):

- Basic vehicle-handling skills (e.g. steering, low-speed manoeuvring).
- Perceptual processing skills (e.g. scanning, use of peripheral vision).
- Cognitive processing skills (e.g. attention, concentration, judging distances and speeds, anticipating and predicting other driver behaviour).
- Risk/hazard assessment and reaction skills (e.g. perceiving, assessing and reacting to hazards, including estimation of own skills and anticipating other driver behaviours).
- Decision making skills (making safe and appropriate decisions based on information processed perceptually, and cognitively after risk assessment and rapidly making appropriate decisions).

Basic vehicle-handing skills are relatively quick and simple to learn and very few crashes are due to deficits in these skills. Learner instruction, on-road practical tests and knowledge tests are likely to adequately address these skills. However, it is unclear how much the remaining higher-order skills are currently addressed by either these or traditional education and training initiatives for Provisional drivers.

Mayhew (1997) has recommended that programs be developed within the multi-stage structure of GDLS models, incorporating a basic driver education and instruction course in the Learner stage and a safety-orientated training course in the Provisional stage

Lonero (1999) believes there is future potential for driver education, instruction and training to provide a positive road safety benefit by developing motivation to support sharing of safer lifestyles, integration of road safety issues into school subjects in areas of social values, risk taking, peer pressure, and so on, in activity peer-based situations and development of media to enhance perceptual and decision making skills. Others have likewise recommended a similar holistic approach to road safety education and training (EU ADVANCED project, 2002; Woolley, 2000).

This contrasts with research findings regarding separate programs run through schools that are not integrated in such a manner. For example, a study in Scotland compared the benefits of two school-based programs at three and nine months post-training (Carcary,

Power & Murray, 2001). While benefits were found for a post-licence, insight-education program at three months post-training, no differences were found at nine months compared to a pre-licence education program and a control group. Further research is needed to determine how driving education can be effectively integrated into classroom curricula and to determine methods that best provide on-going effects of the benefits of such education.

3.7.8 Display of L and P-plates

Most Australian and some overseas jurisdictions require novices to display plates that indicate their status as either a Learner or Provisional driver. In Australia, Learner drivers display L-plates and Provisional drivers display P-plates. In British Columbia, novice drivers display N-plates (ICBC 2002), while in Northern Ireland they require R-plates (Baughan & Simpson, 2002).

Staysafe 37 (1997) suggests these status plates are valuable for several reasons:

- They allow better enforcement.
- They allow other road users to be aware that the driver is a novice so that greater caution can be exercised.
- They may help limit the risks that novices are willing to take whilst displaying their licence status.

Certainly the ability to enforce GDLS requirements or restrictions for novices that do not apply to fully-licensed drivers is compromised in the absence of status plates, simply because this compromises the ability to detect such drivers. This can particularly include lower maximum speed or BAC limit restrictions. As an example, drink-driving enforcement programs that include random roadside testing tend not to automatically require drivers to present their licence. It is therefore possible for a Provisional driver without P-plates displayed who is over a zero or reduced BAC limit (e.g. 0.02%) but below the general tolerance (e.g. 0.05%) to avoid detection of this licence violation. Such violations may well only be detected for drivers who are involved in crashes or are driving dangerously or erratically and are detected by Police.

During 1994-1995, Norway introduced a requirement for Learner drivers to display status plates when under private driver instruction. An evaluation of Norway's licensing initiatives reported by Norway's Institute of Transport Economics (TOI, 1998) found a reduced crash risk for Learner drivers and suggested that the requirement to display the plates may have contributed to this reduction.

In the Australian Capital Territory, the removal of licence status plates is used as an incentive for Provisional drivers to undertake additional driver education and/or training. Staysafe 37 (1997) suggests the requirement to display P-plates could also be used as an incentive for safer driving by removing this requirement for Provisional drivers who have had a violation-free record for 12 months.

3.8 Potential GDLS components

3.8.1 Mobile phone restriction

Minimising in-vehicle distractions is an important objective of other GDLS initiatives, such as passenger restrictions. As noted by Ferguson (2003), many other devices already exist in

vehicles that can provide distractions to drivers, including radios, CD players and new technologies like navigation devices. From this perspective, mobile phones are another potential distraction device for drivers.

While it is difficult to obtain accurate data on mobile phone use and crash risk, as the presence or use of phones while driving is not generally recorded in crash data (NHTSA, 1997a; RoSPA, 2002), research suggests that mobile phone use, including hands-free use, is associated with greater crash risk for all drivers (e.g. Beirness, Simpson & Pak, 2002; Brühning, Haas, Mäder, Pfafferott & Pöppel-Decker, 1998; Laberge-Nadeau, Maag, Bellavance, Desjardins, Mesier & Saïdi, 2003; Ranney, Mazzae, Garrott & Goodman, 2000; Redelmeier & Tibshirani, 1997, 2001; SWOV, 2000; Violanti, 1998; Violanti & Marshall, 1996). Estimates indicate that the distractive effects of mobile phone use while driving increases crash risk by around 25% and that the risk of a driver fatality is between 4-9 times higher than when not using a phone.

Redelmeier and Tibshirani (1997, 2001) also suggest that risk estimates are conservative due to a serious under-reporting bias, as drivers are reluctant to provide information on their activities just prior to a crash that may implicate personal responsibility for the crash. They found that risks were similar for calls placed by the driver and calls received by the driver, during the day and night, during summer and winter, irrespective of age and experience.

The Royal Society for the Prevention of Accidents (RoSPA, 2002) suggest that any mobile phone use when driving adversely affects driver performance by impairing the following driving skills:

- Maintenance of lane position.
- Maintenance of appropriate and predictable speed.
- Maintenance of appropriate following distances.
- Judgement and acceptance of safe gaps in traffic.
- General awareness of other traffic.
- Reaction times.
- Vehicle control following later detection of events in the environment.

One study that has examined mobile phone use by novice drivers, among other distractions, is that of Wikman, Nieminen and Summala (1998). Wikman et al investigated the duration of drivers' glances away from the road while driving when dialling a mobile phone, changing an audio cassette or tuning the radio. They found that novices' glance duration was more variable than that of experienced drivers, including more short and long glances at the distraction device. In addition, 29% of novices made glances that were lengthier than the maximum glance duration of experienced drivers. Moreover, these lengthy glances were associated with greater lateral displacement of the vehicle.

Ferguson (2003) reports that, while legislation to ban mobile phone use when driving is being widely considered in the US for all drivers, several states that introduced such legislation for teenage drivers did not enact that legislation. To date, one state, New Jersey has enacted legislation prohibiting Learners and Provisional drivers to use a mobile phone while driving. This was effected in August 2002 but has not yet been evaluated.

3.8.2 Age and size of vehicle recommendations

While most young driver initiatives focus on the driver and their crash risks, it is also important to examine vehicle protection factors such as vehicle age and vehicle size. Young drivers tend to drive smaller cars that provide less crash protection and to drive older cars that lack many of the safety features of modern vehicles, such as airbags (Arup Transportation Planning, 1995; Cammisa, Williams & Leaf, 1999; Williams, Preusser, Lund & Rasmussen, 1987). These factors reduce the protection offered to occupants, increasing their risk of serious injury (Di Pietro, 1998; Ferguson, 2003).

Cammisa et al (1999) found that car ownership by young drivers was related to their increased crash risk. They found that, once licensed, 60% of young people drove a vehicle that was different to the one in which they learned to drive and that 28% of these changes were from a larger to a smaller car. The main reasons young drivers chose to drive a particular vehicle was existing ownership (38%), the vehicle was cheap (22%), it was what the driver wanted (13%) or it was small and manoeuvrable (10%). Safety features were rarely mentioned as a reason for choice of vehicle (<2%). Cammisa et al concluded that requiring novices to drive only larger and/or newer vehicles would decrease their crash involvement.

In contrast, a study of family decisions of which vehicle a young, newly-licensed driver should drive found that much more emphasis was placed on transmission type (automatic), fuel economy and safety features (ABS and airbags) than large size (Rivara, Rivara & Bartol, 1998).

These findings suggest better education is needed regarding the safety benefits of buying a slightly older but larger car with more safety features over a similarly-priced younger but light or small car that offers less crash protection (see Newstead, Cameron & Watson, 2004). In general, for example, a somewhat older, larger sedan or station wagon offers greater crash protection than a new, small hatchback of comparatively similar cost.

While this issue is difficult to address within a GDLS, Ferguson (2003) has recommended that young drivers and especially parents, who are an integral part of the GDLS process, be made aware of vehicle aspects other than obvious safety features such as airbags that moderate crash risk, including increased risk of small size, high power and unstable vehicles, such as four wheel drives. Providing parents with educational materials has recently been shown to be effective in positively influencing newly-licensed drivers' road safety behaviours (Simons-Morton, Hartos & Beck, 2003).

3.8.3 Education and training methods from fleet initiatives

Further options for education and training programs that do not appear to be currently under consideration within GDLS models are those offered by fleet initiatives. These include peer group discussions and environmentally-friendly driving initiatives.

Peer group discussions

A 'classic' study of fleet safety initiatives is known as the Swedish Telecom Study by Gregersen, Brehmer & Morén (1996). Gregersen et al (1996) compared the effectiveness of four training methods to a control group over a one-year period. These were:

- A peer group discussion program that comprised several small group discussions on how to best meet suggestions on company road safety measures.

- A driver-training program based on insight-training principles.
- A campaign program that circulated seasonal information on road safety issues on several occasions.
- A 'bonus' program that included financial incentives to reduce crash claims.

The study compared the crash involvement of the fleet driver groups two years prior and two years following program participation. While the driver-training group experienced a large reduction in crashes, crash reductions were greatest for the group discussion drivers. This highlights the role of the peer group when aiming to modify long-held attitudes and behaviours.

The importance of social factors in understanding driver behaviour, especially peer relationships, has been highlighted by road safety researchers (Canterbury, Gressard, Vieweg & Grossman, 1992; Evans, 1987; Horneman, 1993; Shope, Waller & Lang, 1996). Other studies have shown that peer intervention can be effective in modifying young drivers' behaviour (e.g. a high school alcohol safety program; McKnight & McPherson, 1986). Therefore, peer group discussions offer a method for potential use in young driver education and training programs that could be explored for future GDLS models.

Environmentally-friendly driving

Environment-friendly driving, otherwise known as EcoDrive initiatives, primarily aim to reduce fuel consumption and emissions through changes in travel behaviour. While the EcoDrive concept also includes advice for car manufacturers, policy changes for roads and infrastructure changes, the focus is on smoother driving styles. Therefore, many of the EcoDriving techniques or changes to driving style are also associated with safer driving behaviours, including the maintenance of more controlled speeds that avoid unnecessary braking and acceleration.

In addition to reducing fuel consumption and emissions (Bongard, 1995; Johansson, 1999; Wilbers, 1999), EcoDrive training has been shown to reduce crash risk for fleet drivers (Johansson, 1999; Reinhardt, 1999; Smith & Cloke, 1999). Reinhardt (1999) analysed the results of a training scheme instituted in a corporate fleet. He found 35% fewer crashes, 22% higher mileage per crash and 28% less fleet driver-induced crashes. With the publicity surrounding the scheme, there was also an image improvement for the company and an increase in positive driver motivation. Another company training program also claimed a 35% improvement in crash rate (Smith and Cloke, 1999).

EcoDrive concepts are currently being used by driver trainers, taught in schools and instituted as part of fleet training programs (e.g. EPA Victoria, 2003; Jim Murcott Driving Centre, 2003). Young drivers are likely to be aware of environmental concerns relating to driving, however, to date, EcoDrive concepts are not widely incorporated in GDLS education and training programs. A noteworthy exception is the Finnish program that has been associated with post-licensing crash reductions (Keskinen et al, 1999). Notable elements of EcoDriving were also included in the abovementioned Swedish Telecom in the peer group discussions that resulted in significant crash reductions (Gregersen et al, 1996).

EcoDriving offers a potential new direction to explore in relation to educating and training novices in safer driving behaviours by associating these behaviours with environmental benefits and benefits in reduced fuel use, which can provide a financial incentive.

3.8.4 Initiatives for recidivists

In WA, research has shown that if a driver's first drink-driving offence resulted from a road crash, particularly at a younger age, the driver was more likely to drink, drive and crash again (Ferrante, Rosman & Marom, 2001). Male drivers under age 25 years were most likely to continue to be re-arrested for drink-driving offences, suggesting that drink-driving violations may be one of the early predictors of 'high risk' drinking drivers.

Featherston, Lenton and Cercarelli (2002) report that each year in WA about 30% or 4,000 drink-drivers are repeat drink-drivers. By far, the majority are male (90%) and 65% are under the age of 25 years. The relative risk of crash involvement for repeat drink-drivers is 2.3 times greater than for drivers without a drink-driving offence. Therefore, it can be argued that, at least regarding drink-driving, recidivism may well apply to young drivers progressing through the WA GDLS and, therefore, it may be beneficial to introduce intervention programs for these drivers through targeted programs.

Education-based programs

It has been argued that targeted driver improvement programs should apply to Provisional drivers who violate traffic regulations (Bartl, 2000; Crettenden & Drummond, 1994). Based on the findings of a review of all post-licensing initiatives in EU countries for the EU-Project DAN¹, Bartl (2000) reported that driver improvement courses have been found to be important in reducing recidivism rates. For example, in Austria, driver improvement courses for drink-drivers, which are conducted by psychologists, were associated with a reduction in drink-driving recidivism by 50% compared to control groups who did not undertake the course. Based on the review, it was recommended that programs should be targeted to the offence and, to the extent possible, targeted at the individual (personal characteristics and attitudes). Moreover, they recommended that, when the offence can be viewed as "a symptom of a socially problematic character" (p. 10), psychologists rather than other educators should conduct the programs.

McKnight and Tippetts (1997) report that many of the US driver improvement programs to target frequent offenders have also been found to reduce traffic violations. Programs that focus on road safety and crash prevention have been found to be less effective in reducing crashes than programs seeking to foster lawful driver behaviour. Notably, when drivers have had the choice either to have their licence suspended or to attend a program, it was found that those who chose not to attend the program tended to have the lower crash risk. This does not, however, reflect directly on the quality of the programs, as it is likely that the suspensions reduced driving exposure and, therefore, the opportunity to re-offend. McKnight and Tippetts concluded that driver improvement courses should not be undertaken as a substitute for penalties, such as licence suspensions, that lead to lower crash risks, particularly those that reduce exposure.

Within Australia, some courts in New South Wales refer repeat offenders to education-based Traffic Offenders Programs (TOPS) after a finding of guilt yet prior to sentencing, which is delayed until such time that the program can be undertaken. An evaluation of the TOPS initiative indicated that participation reduced the probability of re-offending by an average of 25% (Saffron, Wallington & Chevalier 1999).

¹ Description and Analysis of post-licensing measures for Novice drivers

It is likely that education programs such as these could be modified to target Provisional driver recidivists.

Other initiatives

Other non-education based sanctions that may form options for deterring serious recidivist offender behaviour include vehicle sanctions involving the use of interlocks (alcohol interlocks for recidivist drink-driving and seat-belt interlocks for recidivist non-restraint use) and vehicle immobilisation, impoundment or permanent confiscation (NRMA, 2002). Emerging technologies intended for the new car market also offer the potential for such devices to be fitted into recidivists' vehicles (Regan, Oxley, Godley & Tingvall, 2001).

Alcohol interlocks have been found to be a significantly effective way to reduce drink-driving recidivism while a device is fitted (Beirness, 2001; Voas, Blackman, Tippetts & Marques, 2002). However, it is reported that such devices are often removed and that, therefore, other incentives or initiatives need to be implemented with education-based programs for long-term benefits (Beirness, 2001; Voas et al, 2002). Metropolis (2004a, 2004b) has proposed that flexible options be made available in WA for alcohol-related offences, including significantly reduced licence disqualification periods and deferred fines for drivers who agree to participate in an ignition interlock program and attend a rehabilitation program, and vehicle-based sanctions for those who refuse to participate. A Royal Automobile Club of WA members survey has shown that 78% support the assertion that "convicted drink drivers should have a breathalyser attached to their ignition as part of regaining their licence". Interviewees suggest there is strong community support for drink-driving initiatives for young drivers, including targeted recidivist programs.

The NRMA (2002) reports that evaluations of vehicle immobilisation, impoundment or confiscation laws in the US and New Zealand have shown reductions of repeat offender behaviour of between 15% to 70% (depending on the sanctioning system in place and other broader factors). In addition, crash reduction benefits have been found. For example, in California, vehicles can be impounded on committing an offence that results in a licence disqualification or when driving on a disqualified licence. Crash reductions of 25% were reported for drivers in the former category and 38% for those in the latter category.

An additional alternative is also found in California's GDLS. A second traffic conviction or at-fault crash within the first 12 months of Provisional licensure results in a 30-day driving restriction that allows only supervised driving by a fully-licensed driver of at least 25 years of age (Tannahill & Smith, 1990). This initiative has not been specifically evaluated.

Overall, several initiatives have been implemented to target recidivists of a range of traffic violations that offer the potential for specific young driver programs to be incorporated into GDLS models.

3.8.5 Intelligent transport systems and licensing

Passenger vehicle changes will be profound in the future (NHTSA, 1997b). The ways in which driver-vehicle interactions, vehicle-vehicle interactions and vehicle-environmental interactions occur will be significantly altered. NHTSA (1997b) estimates that emerging intelligent transport systems (ITS) technologies may reduce crash rates by one million per year by the year 2020 in the US.

IIS research is a growing area of human factors research that brings together advanced information processing, communications, sensing and computer control technologies in order to produce systems that are able to address specific high-risk drivers or high-risk behaviours, such as breaches of licence restrictions (Regan, Mitsopoulos, Haworth & Young, 2002; Regan et al, 2001). The inclusion of warning devices and other in-vehicle feedback mechanisms to the driver can be viewed as a method of in-car training.

While IIS programs are not currently targeted at novice drivers, they have the potential to do so (Regan et al, 2001). These include, for example, speed adaptation devices that warn drivers if they are driving over the speed limit, lane departure and lane change warnings that notify drivers if they are veering off the road or into other lanes, and forward collision warnings that notify drivers if they are driving too close to the car ahead. Visual enhancement systems can also assist novices in detecting hazards in conditions of poor visibility, such as pedestrians, cyclists and motorcyclists. Devices to detect and counteract fatigue are also under development. Combined with alcohol and seat-belt interlock technologies, these systems offer considerable potential to reduce crashes and injuries for novice drivers.

Engström et al (2003) caution that research is needed to determine whether they will improve or worsen young driver crash involvement. Research has indicated that novice drivers are not as efficient as more experienced drivers when it comes to cognitive processing of in-vehicle distractions and the ability to upkeep safe driving practice (Ferguson, 2003). Increased cognitive demands, such as spatial processing and visual input, as often required by IIS, can result in the degradation of vehicle controls, such as steering (Boer, 2001). A study by McKenna and Crick (1994) also found that, when performing a driving task, novices were less immune than experienced drivers to extraneous variables.

On the positive side, research has indicated that simply installing crash data or 'black box' recorders, such as those used in aviation, into both commercial and private vehicles has been associated with reductions in crashes and crash severity (Rumar, Fleury, Kildebogaard, Lind, Mauro, Berry, Carsten, Heijer, Kulmala, Machata & Zackor, 1999). This suggests that simply knowing their performance is being monitored can deter drivers from engaging in unsafe driving behaviours. Such a device may prove to be an important component of IIS features for young drivers.

Other issues such as acceptability are also important in determining the potential effectiveness of IIS training. This issue was addressed in recent focus group research with Victorian drivers aged between 18-83 years (Regan et al, 2002). Results showed that participants were generally in favour of the IIS technologies discussed and believed they could be particularly useful for young drivers. However, they were not in favour of any system that could be circumvented, if it compromised their privacy, or if it was not compulsory for all drivers.

3.9 Other GDLS considerations

3.9.1 Social acceptability & community support

GDLS components, particularly night-time driving and passenger restrictions are often perceived to be socially unacceptable and likely to lack community support. However, surveys of the impact of such restrictions are more favourable than might be anticipated,

with high levels of support found both before and after a GDLS is introduced (Mayhew, 2000).

A year after New Zealand's GDLS was implemented, results of a survey by Whines (1988; cited in Baughan & Simpson, 2002) found there was no notable strong opposition to the system by young drivers. Those directly affected by the system were less supportive than others, with novices citing some inconvenience due to the restrictions, such as finding a supervisory driver if they wished to drive at night or with passengers. Less concern was expressed by 15-17 year olds and more by rural residents and females who were concerned about lack of public transport and personal safety. However, positive aspects were also identified. Young drivers reported less pressure from their peers to provide lifts, to drive at night when tired or after consuming alcohol. In addition, less self-reported traffic offences were reported after the GDLS was introduced, as well as an increased perceived risk of detection. A later survey by Begg, Langley, Reeder and Chalmers (1995) found 70% of young drivers agreed with their GDLS restrictions.

More recent US research found that the majority (75%) of young drivers surveyed who were affected by GDLS restrictions in California reported that they were able to do the activities they wanted and that they had not been unduly affected by either night-time driving or peer passenger restrictions (Williams, Nelson & Leaf, 2002). In addition, the majority of parents (79%) strongly endorsed the program. A similar level of support was found for night-time driving restrictions in an earlier national survey in the US (Ferguson & Williams, 1996). Three out of four parents of 17 year olds reported support for the initiative.

Parental support in the US has also been found to differ for specific restrictions. It has been reported that up to 90% of parents and over 70% of novices support night-time driving restrictions (Ferguson, Williams, Leaf & Preusser, 1999; NHTSA, 1998; Williams et al, 1998). In North Carolina, 43% of parents surveyed supported passenger restrictions and 74% night-time driving restrictions (Highway Safety Research Centre, 1996). In Florida, 60% of parents of young drivers supported passenger restrictions, 90% supported night-time driving restrictions, while 74% favoured a GDLS with both these restrictions (NHTSA, 2000).

Overall, the majority of young drivers affected by restrictions report only marginal inconvenience and are supportive of GDLS initiatives, as are parents (Begg et al, 1995; Mayhew et al, 1998a; McKay & Coben, 2003; NHTSA, 2002; Waller et al, 2000; Williams et al, 2002). Young drivers have reported adapting to night-time driving restrictions by arranging lifts or by arriving at destinations earlier (William & Preusser, 1997).

In 1999, Pennsylvania introduced a mandatory minimum Learner period of six months, requiring 50 driving hours and limiting passengers, as well as extending an existing night-time driving restriction for Provisional drivers to commence one hour earlier at 11 pm through to 5 am (McKay & Coben, 2003). McKay and Coben (2003) found that, while parents were particularly supportive of the mandatory minimum Learner period, and found the passenger restriction acceptable, they expressed some inconvenience by the earlier night-time restriction, especially following school events, but favoured the restriction overall¹. Young drivers affected by the restrictions were less favourable of the changes, believing the six-month Learner period was too long and the night-time restrictions too early, but generally accepted the passenger restriction. Of note, parents (correctly) identified the main

¹ Note that exemptions for school activities apply in other jurisdictions, which would address much of this concern.

cause of young drivers' inflated crash risk to be inexperience, while the young drivers believed immaturity and personality issues, especially wanting to "show off" were the primary factors. McKay and Coben suggested these differing perceptions influenced their reactions to the GDLS changes, indicating that education should be made an important feature of new legislation.

Research suggests that parents do not always understand novice driving risks well, being aware of their increased risk in general, but not in relation to specific situations such as driving at night with peer passengers (Simons-Morton & Hartos, 2003). Simons-Morton and Hartos (2003) suggest that parents are often ambivalent about novice driving, in that they are concerned about the risks but are also interested in reducing the time they spend transporting their teenage children. They suggest this may contribute to their weaker support for passenger restrictions, which apply all day, than for restrictions at night only. Notably, it has been reported that in Michigan, where the GDLS requires a high level of parent involvement, parents describe how this experience has "brought home to them" (p.20, Waller, 2003) how much the young driver needs additional practice. Such involvement can help raise parents' understanding of the objectives of GDLS restrictions, which they may in turn feed back to their teenage children. Preusser and Leaf (2003) also highlight positive parental awareness and parental restriction findings in jurisdictions that did not have a GDLS in place.

Therefore, education for parents (or guardians) of Learner and Provisional drivers is required in addition to education for the young drivers themselves in order to maximise the effectiveness of GDLS. Parents need to be educated about the importance of their role in supporting and maximising extensive driving experience and how they can facilitate compliance with (and enforce) GDLS restrictions (Steenbergen, Kidd, Pollak, McCoy, Pigman & Agent, 2001). A major role for driver education, instruction and training is to create a more realistic view by parents of their children's driving abilities and motives. Graduated licensing allows a longer and more involved role for families in the driving process (Lonero, 1999).

3.9.2 Impact on mobility and equity issues

Carseldine (1998) notes that any GDLS initiatives must consider potential effects on mobility. Generally this is a noted concern of both night-time driving and peer passenger restrictions. However, it is important to reinforce that purposeful, non-recreational driving is not targeted. Young drivers are exempt from night-time driving restrictions when travelling for work and education and can carry family members so that regular family activities are not affected. They can also drive under the restrictions when an experienced driver is present so that valuable experience is gained before full licensure.

Night-time restrictions for young drivers in Victoria have been opposed on the basis that they would unfairly discriminate against rural communities where there is little public transport (Carseldine, 1998; Drummond, 1994). Unfortunately, the studies examined in the preceding section did not distinguish between metropolitan and rural drivers when investigating attitudes towards GDLS restrictions. A report on WA's GDLS has emphasised the need to consider specific individuals and minority groups (such as indigenous Australian communities and drivers from remote areas) to minimise disadvantages and allow more flexibility when necessary (BSD Consultants, 2000).

While it is not necessarily favourable to create systems which differentially apply to particular groups of individuals or include multiple exemption options, it must be

recognised that there may be no one system that is perfect for all individuals and community groups within a given licensing jurisdiction. Financial, geographical and even seasonal factors (e.g. varying weather patterns in which to gain driving experience as Learner) and many other factors need to be considered such that the system mandated is one that is the most beneficial for the majority of residents. This then needs to be supported by the inclusion of exemption processes or alternative programs for certain individuals, groups or driving conditions.

3.10 Summary of GDLS effectiveness

Young and experienced drivers are over-represented in crashes, fatalities and serious injuries worldwide. The primary aim of GDLS models is to reduce this risk by allowing driving only in lower-risk circumstances in the first years of driving. While the implementation of GDLS is a relatively new feature of licensing, it has been effective in achieving this aim, albeit to varying degrees. Overall, the literature clearly shows that, on average, jurisdictions that implement GDLS models, particularly models that including night-time driving and peer passenger restrictions, will achieve greater reductions in fatal crashes involving young drivers and passengers compared to simpler licensing models.

Australian GDLS models vary greatly. While most have addressed the need for reduced BACs and differential penalty systems for driving offences, other requirements and restrictions are limited compared to systems in place in overseas jurisdictions.

It is important to recognise that GDLS features do not necessarily affect risk on their own but as a function of the full GDLS model in place. While it can be difficult to determine exactly which combination of all potential requirements and restrictions is optimal, some components have been identified as particularly effective.

The following GDLS initiatives were found to show clear associations with crash reductions:

- Increasing the minimum Learner period (to subsequently increase on-road supervised driving experience).
- Introducing night-time driving restrictions for Provisional drivers.
- Introducing peer passenger restrictions for Provisional drivers.
- Mandating a zero BAC limit for both Learner and Provisional drivers.
- Mandating seat-belt use at all times for both Learner and Provisional drivers.
- Removing age-based exemptions from GDLS restrictions.

There was theoretical support for the following GDLS initiatives and some research suggesting benefits, although the initiatives have not yet been fully evaluated:

- Mandating minimum supervised driving hours for Learner drivers with increased involvement by parents.
- Extending the Provisional licence period by increasing the minimum period or raising the minimum age for full licensure.
- Issuing warning letters, requiring a good driving record for progress to full licensure and lowering the demerit point threshold for Provisional drivers.
- Mandating display of *L*-plates and *P*-plates.

- Including attitudinal/motivational issues in graduated education, instruction and training programs (within GDLS models only).

The effectiveness of the following GDLS components are currently limited, inconclusive or unknown, but have not resulted in counterproductive findings:

- Allowing a lengthy Learner permit tenure and no fees to renew permits to discourage early licensure, although this allows a longer period in which to gain supervised experience.
- Mandating supervisory driver requirements, including minimum age and driving experience, BAC limit and absence of recent licence disqualification or demerit point limit.
- Recommending that Learner drivers are only accompanied by a supervisory driver in the initial stages of learning, before allowing driving with multiple passengers.
- Restricting Provisional drivers from driving high-powered vehicles.
- Increasing penalties for driving offences for Provisional drivers and extending the Provisional period by the length of any licence suspensions or disqualifications.
- Mandating towing restrictions for both Learner and Provisional drivers.
- Inclusion of graduated/multi-staged testing requirements, including knowledge tests, on-road practical tests and assessments, hazard perception tests, exit tests and retesting requirements.

Research on the effectiveness of mandating maximum speed restrictions for both Learner and Provisional drivers is also limited, however, some potentially counterproductive associations have been found.

Two GDLS initiatives were clearly found to be counterproductive, with links to increased crash risk:

- Education initiatives that encourage early licensure.
- Extensive professional instruction in the absence of sufficient private supervised driving experience.

In addition to these existing GDLS components, several initiatives not currently included in GDLS models were identified in the literature as offering potential new directions:

- Mobile phone restrictions (including hands-free use).
- Age and size of vehicle recommendations.
- Education and training methods from fleet initiatives, including peer group discussion and EcoDriving programs.
- Targeted initiatives for young driver recidivists, including education-based programs, alcohol and seat-belt interlocks and vehicle immobilisation or impoundment programs.
- Intelligent Transport Systems developments that can act as a training tool for young drivers warn of high-risk conditions and, potentially, assist timely and accurate responses.

Perhaps surprisingly, even some of the more stricter GDLS models have received acceptable levels of community support by both young drivers and parents/guardians; if not at the time of their introduction, a year or so later. Introducing any GDLS restrictions involves a

trade-off between crash and injury reductions and the driving needs of young people. Notwithstanding the need for further research on the potential impact of new GDLS requirements in the WA context, particularly the likely benefits of night-time driving and peer passenger restrictions, the literature review suggests that an appropriate balance can be achieved and is worth investigating.

Chapter 4 OTHER YOUNG DRIVER REGULATORY SYSTEMS

4.1 Police enforcement

Police enforcement, or indeed the perceived risk of detection by Police, can play a vital role in determining the extent to which a legislative initiative is effective (Cameron & Sanderson, 1982). If there are few or no perceived consequences for non-compliance with regulations then compliance rates can be low. Conversely, if the chance of being detected and subsequent consequences are perceived to be high, compliance can increase.

Overtly dangerous or risky driving behaviours can attract Police attention for all drivers. Less obvious to detect are risky violations of licensing requirements or restrictions that apply to young novice drivers but not fully-licensed drivers, particularly if appropriate *L* or *P*-plates are not displayed. These tend not to be the focus of targeted Police enforcement programs, which rather tend to focus on major road safety issues that apply to all drivers, such as speeding and drink-driving programs, in ways that may or may not always be sensitive to differential regulations for novices.

For example, violations and penalties for infringements detected via use of automated, electronic speed enforcement (such as speed and red light cameras) are issued to the vehicle owner in the first instance. This can allow a young person driving a parent's vehicle to escape the appropriate penalties if that parent (or potentially other individual) is willing to incur the violation to help the young driver avoid a licence suspension, for instance. With current widespread use of electronic speed enforcement in Australia, these types of scenarios need further exploration. It is possible that enforcement programs specifically targeting young drivers are necessary for certain violations, such as speeding.

4.1.1 Compliance with GDLS requirements and restrictions

Naturally, the higher the level of compliance with GDLS restrictions the greater the potential benefits. Nonetheless, Mayhew et al (1998a) highlighted that GDLS benefits have been found in the US even though non-compliance with certain restrictions was common.

Surveys of young drivers have identified a range of compliance issues:

- In North Carolina, 17% of young drivers reported that they had driven without the required supervisor (Foss, Goodwin, Feaganes & Rodgman, 2002).
- A survey in Nova Scotia found that 9% of learners surveyed drove unsupervised and 2% reported drinking and driving. Of the Provisional drivers surveyed, 3% reported drinking and driving, 39% reported violating the (limited) passenger restriction, and 40% reported violations of the night-time driving restriction (Mayhew et al, 1998a).
- Approximately 40% of Provisional drivers in California reported violations of the night-time driving restriction (Williams et al, 2002).
- A restriction from driving on freeways for learner drivers in Ontario was associated with a 61% reduction in the freeway crashes of learner drivers, which nonetheless indicates problems with compliance, which otherwise would have resulted in a 100% reduction (Boase & Tasca, 1998).

- An Australian survey found that, in all states, 10% of learners and over one-third of Provisional drivers surveyed had not displayed their licence status plates all of the time (Haworth, 1994).
- Victorian crash statistics show that approximately 20% of fatal crashes involving 18-20 year olds are alcohol related, despite a zero BAC limit applying to these drivers (VicRoads, 2002a). Similar compliance problems have been reported with the zero BAC restriction in Ontario (Boase & Tasca, 1998).

Foss and Goodwin (2003) also report that non-compliance with passenger restrictions is more common than for night-time driving restrictions. They argue that while parents are able to monitor use of a vehicle at night and their supervision requirements, it is far more difficult to monitor the carriage of passengers (when supervisors are not present) and this may contribute to the greater non-compliance.

Mayhew et al (1998a) noted, however, that while the proportions of young drivers reporting non-compliance was relatively high in some instances, those that had violated the restrictions reported doing so only rarely. Notably, up to 72% of those violating some conditions (e.g. the night-time driving restriction) did so with their parents' permission. Conversely, parents indicated it was easy to enforce the restrictions.

Drummond (1994) proposed that large numbers of restrictions placed on young drivers might lead to decreased compliance and foster disdain for traffic law and authority at an early stage of driving. This is generally of less concern in US jurisdictions where the Provisional period often extends from a minimum age of about 16 years (or even younger) with restrictions most commonly applying for 6-12 months and beginning drivers of 18 years or older are usually exempt from GDLS restrictions. This compares to Australian jurisdictions, where the Provisional period often commences at a minimum of around 17 years of age and extends through to 19 or 20 years of age, therefore overlapping with the legal voting and drinking age; a period that is associated with adult status in the community. Imposing significant restrictions at this time might appear to contradict this message of their changing role in society. Nonetheless, it is appropriate that driving should be viewed separately from other rights for young people due to the disproportionately high risk of being involved in an injury crash during the early stages of unsupervised driving.

Young drivers and the community in general need to be properly educated with respect to any initiatives that are introduced so that restrictions are viewed as protecting and preparing the driver for the increasingly higher risk they face as they progress through the system rather than as a punitive measure. Research from Florida, US, provides support that this is possible. The implementation of Florida's GDLS was shown to improve attitudes towards road safety measures in addition to reducing crash rates for target groups (McCartt, 2001).

4.1.2 Enforcement of GDLS requirements and restrictions

Mayhew (2000) acknowledged that if a penalty system is to be effective it must have appropriate penalties for violations of the restrictions in place along with avenues for remediation (e.g. youth-orientated improvement programs). Siegrist (1999) argued that enforcement was a necessary component for any crash reduction strategy involving young drivers, while Drummond (1994) indicated that, if a law exists, it should be enforced to confirm for the community that the matter of the law is serious. Alternatively, Hirsch and Maag (2001) discuss a number of inadequacies associated with using enforcement as a road safety countermeasure, including:

- The randomness of law enforcement.
- Evidence that legal sanctions reduce crash risk is weak.
- Legal compliance does not always decrease crash risk.
- The law sometimes fails to penalise drivers when they drive dangerously. (They found only 57% of crash-involved drivers who committed behavioural errors or unsafe driving acts were charged.)
- Traffic violations do not lead to the recall, diagnosis or treatment of the driver for their behavioural deficiencies and even if this occurs it may come too late.

A survey of judges, Police and other enforcement agencies in Kentucky, US, found that GDLS restrictions were difficult to enforce and licence suspensions were not seen as a sufficient deterrent; however, this may have been due to poor education strategies that failed to make new drivers aware of the consequences of violations (Steenbergen et al, 2001). Mayhew et al (1998a) indicated that novice drivers poorly understood the penalties associated with violating GDLS restrictions and, therefore, there was a need for greater knowledge associated with a belief that regulations were enforced before compliance with GDLS restrictions would improve.

Regardless, Mayhew (2000) concluded that enforcement by Police was not an important factor for GDLS to work in the US as compliance with restrictions was found to be mainly voluntary (self-enforcing) and parents/guardians had an important role in informally enforcing them. Parents, not Police, are considered the chief enforcers of US night-time driving and passenger restrictions (Williams, 1999). US Provisional drivers are generally younger than those in Australia (on average 16 years) and therefore many still live with their parents and drive their parents' vehicles. This allows parents to be more involved with monitoring their driving and enforcing the restrictions than for those drivers who are comparatively older and may have moved out of home and have access to their own vehicle. Notably, however, Begg et al (2001) reported that New Zealand, which allows unsupervised licensing at a similarly young age, experienced low compliance rates and consequently introduced strict demerit point penalties and monetary fines for non-compliance in 1999. Therefore, self-enforcement and parental involvement alone were insufficient.

Carseldine (1998) has raised concern that providing exempt conditions within restrictions (such as allowing certain passengers in passenger restrictions and purposeful driving in night-time driving restrictions) may make such restrictions too difficult to enforce. While this may indeed be true, it does not necessarily follow that potential benefits of the restrictions would be undermined. According to general deterrence theory, potential offenders can be motivated through fear of detection, regardless of how low that threat may be in reality (Cameron & Sanderson, 1982). That is, even without extensive Police enforcement, the threat of detection might nonetheless deter young drivers from violating the restrictions. Grosvenor, Toomey and Wagenaar (1999) have also argued that perceived certainty of detection and punishment is more of a deterrent than severity of punishment.

Overall therefore, it seems there is not a need for intensive enforcement of GDLS regulations, but rather a need to establish the threat of detection. New Zealand aimed to achieve this by introducing harsher demerit point and monetary penalties. It might also be possible to run limited yet highly visible programs when first introducing the initiative to raise the threat of detection. This follows the 'booze bus' approach to drink-driving enforcement. This highly visible program, which operates at varying times of day and days of the week, creates a high perceived risk of detection, even though actual risk is relatively

low (e.g. Harrison & Pronk, 1998). In Victoria, which has a high visibility RBT regime with substantial supporting publicity, Christie (1996) found that a majority of survey respondents perceived the risk of detection, apprehension or charge for drink-driving to be a better than even chance.

4.2 Regulations regarding young people's access to and consumption of alcohol

Shults et al (2001) have proposed a conceptual model of the relationships between involvement in alcohol-related crashes and legislative measures regarding young people's access to and consumption of alcohol, as a logical framework for reviews of interventions to reduce alcohol-impaired driving. The model is depicted in Figure 4.1.

Shults et al propose that interventions such as the minimum legal drinking age and GDLS measures such as lower BAC limits can reduce the incidence of drink-driving and, subsequently, alcohol-related crashes and injuries, via three pathways; namely, by reducing alcohol consumption in high-risk settings, by fostering social norms that reduce alcohol consumption prior to driving, or by increasing the perceived risk of detection. These legislative measures include the minimum legal drinking age and legal age to purchase alcohol, which are explored further in the following sections.

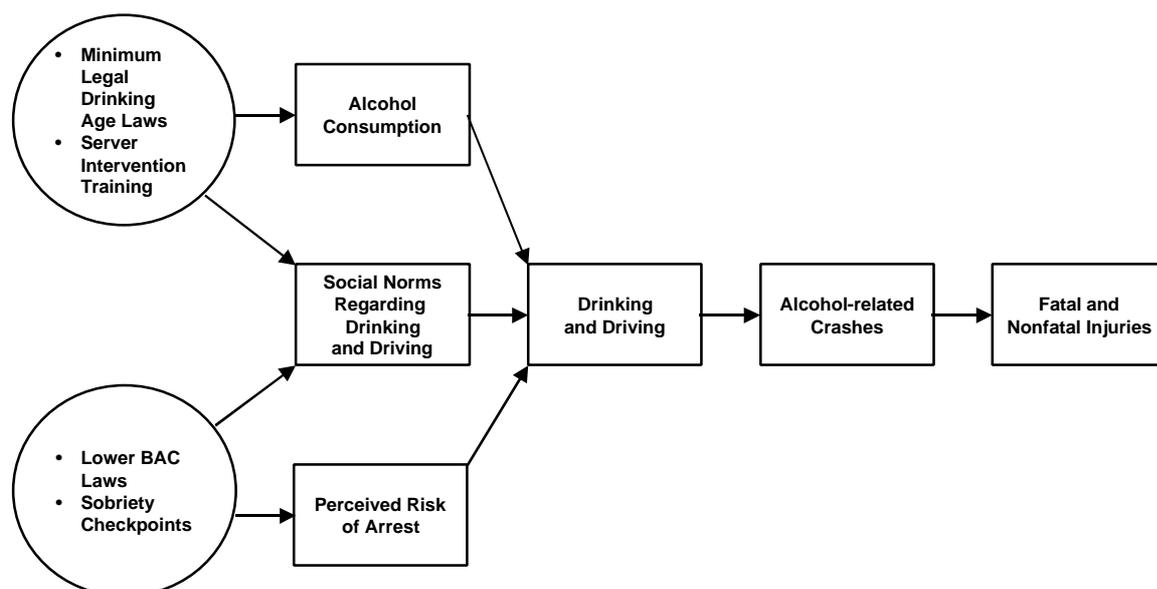


Figure 4.1. Conceptual model of factors influencing alcohol-impaired driving and consequences, adapted from Shults et al (2001).

4.2.1 Legal age for alcohol consumption

Shults et al (2001) have concluded that there is strong evidence that minimum legal drinking age laws, particularly the 21 years limit in the US, are effective in preventing alcohol-related crashes and associated fatalities and injuries. In the US, the minimum legal drinking age of 21 years was reduced to 18, 19 or 20 in 29 states during 1970-1975 (coinciding with conscription of 18 year olds during the Vietnam War and subsequent reductions in the minimum voting age to 18 years) (Toomey, Rosenfeld & Wagenaar, 1996).

However, due to increases in fatality crashes and federal concerns, legislation was introduced such that by 1987/88 the 21 year minimum was reintroduced and thus applied to all US states, allowing a number of evaluations to be conducted (Shults et al, 2001; Toomey et al, 1996).

Shults et al (2001) conducted an extensive review of the literature and found that lowering the minimum age was associated with a median increase in fatalities of 8% (ranging from 2-38%), while increasing the age was associated with a median decrease of 17% (ranging from 7-30%). Likewise, lowering the minimum age was associated with a median increase in all injury crashes (fatal and non-fatal) of 5% (ranging from 2-22%), while increasing the age was associated with a median decrease of 15% (ranging from 6-33%).

4.2.2 Legal age for alcohol purchase

Stewart (1999) has argued that enforcement of minimum purchase age laws should be the cornerstone of any underage drinking prevention effort. US Laws regulating 21 years as the minimum purchase age for alcohol are considered extremely effective in reducing both alcohol consumption and its consequences, with more than 17,000 lives believed to be saved through reductions in alcohol-related crashes (National Highway Traffic Safety Administration, 1998; Wagenaar, 1993).

Stewart (1999) suggests that, overall, the most effective and efficient strategies to maximise the effectiveness of this initiative are aimed at retailers coupled with vigorous enforcement of the laws prohibiting sales to minors. These include:

- Vigorous use of compliance checks.
- Application of appropriate sanctions to violating merchants.
- Education of merchants regarding techniques and responsibilities.
- Laws that allow alcohol outlets to be sued if they serve alcohol to a minor who later causes injury.

Stewart (1999) also highlights enforcement strategies aimed at youth, with some showing promise of effectiveness:

- Laws that allow for the suspension of the offender's drivers licence even when the offence did not involve driving, e.g. minor in possession.
- Special police "party patrols" to contain underage parties and ticket both minors and any adults who provide alcohol to them.
- Penalties applied to the use of false identification.
- Programs that allow police to ticket minors attempting to purchase alcohol.

Several measures are also recommended to reduce the social availability of alcohol, and more generally in the community, including:

- Development of community support for enforcement.
- Keg registration laws (requiring purchasers of kegs of beer to be identified and matched to an identity tag on the keg).
- Enforcement of laws against buying alcohol for minors.
- Sales displays that discourage shoplifting.

- Special enforcement campaigns to prevent parties where alcohol is served to minors.
- Parent coalitions to reduce alcohol use by their children.

4.2.3 Broader community measures

Buescher, Martin and Foss (1998) suggest that community controls of alcohol sales and availability are often more effective than attempts to convince individuals to change their behaviour voluntarily. Effective policies include reducing access to alcohol among youth by price increases and restrictions on retail outlets. The researchers suggest that raising the price of beer by 10% would, by reducing consumption, result in a 5% reduction in the number of incidents of violent behaviour among college students. According to Saffer and Grossmann (1987, cited in Assailly, 2000), there is a correlation between the price of beer and fatal crashes among young people.

Stewart (1999) has also recommended the following initiatives to help reduce young driver crashes:

- An increase in price through excise taxes.
- Conditional use permits for alcohol outlets.
- Controls on outlet location and density.
- Controls on hours of sale.
- Prohibitions or controls on alcohol use at community events or in public areas (e.g. at county fairs, in parks or at beaches), which can also be seen as a control on access.
- Prohibition of alcohol sponsorship of public events.
- Media campaigns, media advocacy, and counter-advertising.
- Controls on alcohol advertising (especially on billboards, sides of buses, and in other public areas).
- Community sponsorship of alcohol-free activities for youth.

However, after conducting a major survey using the Student Alcohol Questionnaire, Engs and Hanson (1999) found that while drink driving behaviours have been decreasing, other activities associated with drinking have not. They conclude that as in earlier attempts at prohibition, limiting alcohol availability to young people is not necessarily a successful method. There has not been a decrease in drinking-related problems except for drink driving.

Further research on the likely effect of these initiatives in the Australian context is warranted.

Chapter 5 CURRENT SITUATION IN WESTERN AUSTRALIA

5.1 Driver-training programs

Two major driver-training initiatives for young people in place in WA are pre-driver programs conducted through secondary schools; namely, the Road Aware Drivers program (although this is primarily a driver education rather than training program) and the Youth Driver Development Program. These two programs are examined in detail in this chapter.

The Royal Automobile Club of WA also contributes to road safety education through its Community Education Section, whose activities include free one-hour road safety presentations at secondary schools; although this program has limited coverage and detail (Elliott, 2000). Elliott (2000) notes that the presentations are primarily made in metro schools to Year 11 and 12 students, and less often to Year 10 students who represent the pre-driver group most likely to benefit from the program¹. Elliot suggests that the program has potential to be beneficial if included as part of a Year 10 road safety education program.

In addition to these programs, there is an extensive number of driving schools throughout WA that provide services for learning to drive and/or defensive and advanced driving programs. See for example, the many driving schools registered with the Australian Driver Trainers Association listed at <http://www.drivertrainers.asn.au/drivingschools.htm>. Literature relating to these programs and their likely effectiveness has been addressed in Chapter 2.

Currently, only those driving trainers who provide instruction associated with licensing are required to be registered in WA. The scope of other providers and programs is relatively unknown. To address this, the Injury Research Centre is conducting an audit for the Department for Planning and Infrastructure of non-practical, assessment-based pre and post-licensing training and education programs offered in WA. The objectives are to estimate the number and nature of programs on offer and to evaluate these against identified 'best practice', in addition to providing details on costs, methods used by program operators to determine program effectiveness, and target audiences.

5.1.1 Road Aware Drivers

The Road Aware program commenced in January 2003 with three overlapping projects targeting three age groups of road users and their parents/carers (Zines, 2003):

- Road Aware Parents: 0-4 year olds.
- Road Aware Kids: 4-14 year olds.
- Road Aware Drivers: 15-20 year olds.

The project was strategically aligned with an existing WA School Drug Education Project (SDEP), as recommended by Elliott (2000).

¹ This partly relates to Year 10 being the last year of compulsory schooling

The Road Aware Drivers program incorporates both a pre-driver education component and a parent workshop component. It is available to all (public and private) secondary schools across the state on a voluntary basis. A pilot program was trialed in about 50 high schools throughout WA in 2003 and was subsequently revised. Full implementation of the program was expected to begin during August 2004 at the time of the interviews, although it is understood this was delayed until September. It is hoped that 90-100 (about 50%) of schools will be reached by end June 2005.

The program receives funding from the Insurance Commission of WA (ICWA) Office. Representatives from education systems and sectors sit on the Management group, that is, representatives from the Office of Road Safety (on behalf of the Road Safety Council and ICWA) and the Catholic Education Office, in addition to representatives from the Department of Education and Training, the Association for Independent Schools, the Department of Health (for SDEP) and the Drug and Alcohol Office (for SDEP).

Pre-driver component

The pre-driver component is known as the Keys for Life program and targets 15-17 year olds who are at the pre-driver or early Learner stage. It was modelled on the Road Ready program in the Australian Capital Territory and also aspects of the Keys Please program in Victoria (see Elliott, 2000). The program has the stated aim to prepare young people for a lifetime of safer driving by:

- developing their understanding of the importance of gaining supervised driving practice;
- fostering positive road-user attitudes and behaviours; and
- involving parents and the community in youth road safety education.

Teachers are trained according to the objectives of the program, not in a prescriptive way, but in order to effect an outcome-focussed approach. The goal is for students to achieve three main outcomes (to be tested at end of the program):

- Knowledge of road safety issues: understanding factors that influence road users' safety.
- Skills for safer road use: use of self-management and interpersonal skills.
- Road user attitudes: understanding positive road user attitudes and how attitudes towards road safety are influenced.

The primary aim of the program, however, is to increase supervised driving hours over and above the mandatory minimum 25 hours, assisted by fostering better negotiation and communication between young people and their parents (as supervisory drivers).

The Pre-Driver program options are extensive, covering some 20 or so issues. It is the teachers who decide the 'who, what and how' details for their particular school and circumstances. This includes, for example, whether the program is effected according to age or year level, how the program is delivered (media and contexts), and which components of the program will/will not be addressed. There is, however, a prescribed essential content component to achieve the three abovementioned main outcomes, and suggestions of a range learning contexts (see Appendix A).

An optional component, and one that is considered to provide an incentive to participate, is the chance to attempt the Learner Phase 1 knowledge test within the school context and potentially at a younger age than would otherwise be possible (i.e. at 15 years). Only schools

that implement programs that address all essential content, extend for a minimum of 10 hours¹, and include a parent workshop are eligible to undertake this option.

The pre-driver program will be fully evaluated by the Injury Research Centre. There will be a population-based evaluation and cohort-based evaluation. For the latter, 500 young participants in the program will be followed from the Learner permit stage (Learner Phase 1) through to two years post-Provisional licensure. They will complete questionnaires on road-safety-related knowledge and attitudes pre- and post-participation, with follow-ups conducted by phone when collecting their Learner Phase 1 permit, at the time of the on-road test (to progress to Learner Phase 2), when progressing to a Provisional licence, and at 12 and 24 months later. The main outcome variables examined will be the amount of supervised driving experience gained (in each Learner stage) and measures of on-road behaviour. For the former, these results will then be linked into a population-based study evaluation of WA's new GDLS model. (The model and evaluation details are described in the following Section 5.2).

There is some concern that the voluntary nature of the program and its effectively different format in each school will make interpretation of the evaluation results difficult. It may be that the ways in which the program is implemented will be more effective in some schools than others, yet only global effectiveness will be able to be evaluated.

Likewise the effectiveness of the program may vary dependent on the age mix of participants. Students participating at 15 years of age may commence the application process for a Learner Phase 1 permit through this process some 10 or even 12 months in advance of reaching the minimum driving age. This can effectively separate any learning from actual experience, which is particularly important given that the program is classroom-based and requires transfer of that learning to the on-road context. The program may be too removed from actual driving for the youngest students to put any lessons learned into practice, such as the need for gaining extensive supervised experience. This may contrast greatly with the experience of older students who can progress directly to on-road driving.

There is some concern that linking the program with the GDT&L system, such that young people can commence the Learner's Permit application process (but not obtain a Learner's Permit) at a younger age than is possible at a Licensing Centre (ie between 15 yrs – 15 yrs 11 months), may encourage earlier licensing, which has been clearly found to be counterproductive in the road safety literature. Conversely it may encourage minimum age entry into the licensing system, which may encourage more time for driving under supervision which has been clearly found to be beneficial in reducing crash rates among young drivers.

Parent workshop

The inclusion of a 90 minute workshop for parents of participants also aims to increase the amount and variation of supervised driving achieved by the Learner through educating and encouraging parents of the benefits of this experience. A key component is providing parents with tools to demonstrate that 120 hours is not a particularly difficult target. This includes marking a calendar with regular weekly activities, such as school and sports runs. Parents quickly see that many hours can be accumulated with these everyday driving

¹ Notably, the program has the potential to be implemented for far greater than this minimum (as found in the pilot)

activities, such that there is not a large burden on parents to devote a large number of hours each week solely to this task.

Evaluation of the Road Aware Drivers pre-driver program

The Injury Research Centre will evaluate the effectiveness of the Road Aware Drivers pre-driver program following its implementation. This evaluation will involve both the pre-driver component and the parent workshop. Process, impact and outcome measures will be collected during the evaluation.

5.1.2 Youth Driver Development Program

The Youth Driver Development Program (YDDP) was introduced in Bunbury in 1998 to address the young driver problem in the South West. The program was also recently introduced in Kalgoorlie, although the information here is primarily based on the Bunbury program. Conduct and general management of the YDDP is undertaken by Roadskills Australia, a registered training organisation. The program is subsidised by state and local government, and sponsored by local companies who provide the driver-training vehicles and other supplies, such as tyres for the vehicles. By these means, participants pay only about one-third to one-half of actual costs.

The aim of the YDDP is to prepare 15-16 year-old students for the task of learning to drive from a safety-orientated perspective. The course provider describes the programs as such:

... the program does not, nor intends to, produce road ready drivers, we are delivering to the commercial driving instructors, students who are aware of the risks and hazards of the road environment, have developed rudimentary control skills and are cognizant of the fact that this is just the beginning of a long and dangerous process. (see Appendix A)

The long-term objective is to reduce crashes, fatalities and injuries involving young drivers.

The YDDP comprises five four-hour training modules with an optional sixth module to complete an accredited St Johns Ambulance first aid course. Students attend in groups of a maximum of nine students, as arranged with their school. This can vary from completing one module per week or all five modules over a two-day period in the school holidays.

The first module is theory based and takes place in a classroom environment, with a focus on vehicle maintenance and safety checks and counteracting the notion "It'll never happen [to me]". The following four modules are described as both theoretical and interactive as they take place 'en route' in the training vehicle. They combine teaching of physical aspects of the vehicle and the driving task with attitudinal-motivational components. This ranges from safety features (e.g. airbags), tyre pressure and vehicle control skills (e.g. manoeuvring, steering and cornering) to addressing the 'big four' (speeding, drink-driving, seat-belts and fatigue), in addition to drug-driving and dealing with peer pressure. The fifth (potentially final) module focuses on the need to drive defensively, on observation, planning and hazard perception. At the end of the program, participants are given a knowledge test (with no pass/fail marks assigned) and are issued with a certificate of attendance.

The four interactive, in-vehicle modules are undertaken off the road on bitumen and gravel surfaces in locations such as large car parks and the like, within a one-half to three-quarter

hour drive from the school. The highest speed reached is about 40 km/h. For these modules, students also keep a reflective diary on their activities and participation.

Some preliminary research on the likely effectiveness of the program is reported by C. Ferguson (2004). Based on pre and post-participation questionnaires, Ferguson did not find evidence for a change in attitudes over time. The results are preliminary only as no control group was included in the study.

The Injury Research Centre is now conducting a controlled evaluation of driving outcome measures. This research will examine licensing and crash records of 1,000 participants who completed the YDDP and were licensed by the end of 2002, and who had been driving for a minimum of six months in 2003. These will be compared with records of up to 10 controls - similar drivers who did not take part in the YDDP - for each case participant (i.e. up to 10,000). The research will examine outcome measures such as crashes, violations, demerit points and suspensions. If possible (if the data can be made available), the evaluation will also account for driving exposure.

Interviewees expressed concern that the country-based focus of the program might result in participants not achieving quality driving experience, that is, experience driving in a variety of circumstances. There was a perception that the program was primarily conducted on straight program roads and excluded experience in an urban context. There was also concern regarding the young age at which participants were driving, that is, at 15 years below the legal Learner age. Other concerns related to possible self-selection issues and regarding the current political opposition party establishing a platform to implement the program across the state.

5.2 Graduated driver training and licensing system

5.2.1 Previous graduated licensing system

Prior to February 2001, WA had a standard three-stage GDLS model in place. Pre-conditions, requirements and restrictions of the system are summarised in Table 5.1.

As shown, supervised driving as a Learner was allowed from a minimum age of 16 years 9 months with no minimum period mandated. Prior to age 17 years, however, only professional instruction was allowed (no private supervision). No reduction in BAC limit applied. A Probationary licence could be obtained at a minimum age of 17 years, which extended for one year, allowing a full licence to be obtained at a minimum age of 18 years. Probationary licence restrictions included a reduced BAC limit and a reduced maximum speed limit.

In accordance with its policy objectives in *The way ahead: Road safety directions for Western Australia* (July 1996), the Government of WA established a Ministerial Council, Road Safety Council and Taskforce to address driver-training and licensing issues. During 1997, the Taskforce developed a concept for a new graduated driver training and licensing system, which it detailed in a discussion paper for public comment *Directions for a new graduated driver training and licensing system* (October-December 1997). The paper was distributed to the general public through the Department of Transport, the Department of Education, Main Roads, Royal Automobile Club of WA, Local Government and the Police. In addition, several stakeholder workshops were held in Perth and various regional locations to provide forums for public feedback. Ten youth discussion groups were also held at five colleges across the state. A total of 729 individuals from a broad cross section of

community groups participated. Responses were summarised in a subsequent report and circulated for further comment. In all, a three-stage discussion process was effected prior to final decisions being made and changes implemented.

Of note, as part of the review process, the term 'Probationary' drivers was superseded by the term 'Provisional' drivers, which now applies to the new GDT&L system.

Table 5.1 Graduated licensing in Western Australia prior to February 2001

Licensing phase/stage	Pre-conditions	Requirements/Restrictions
Learner permit	<ul style="list-style-type: none"> • Minimum age 16 years 9 months • Successful completion of eyesight test • Successful completion of road law knowledge test 	<ul style="list-style-type: none"> • Must be accompanied by supervisory driver; if under 17 years of age this must be a professional driving instructor¹ • Must display <i>L</i>-plates on front and rear of vehicle • Maximum speed restriction: 72 km/h (45 miles/h) • Restricted from driving on freeways
Probationary licence	<ul style="list-style-type: none"> • Minimum age 17 years • Successful completion of practical driving test 	<ul style="list-style-type: none"> • Must display <i>P</i>-plates on front and rear of vehicle • Maximum BAC limit: 0.02% • Maximum demerit points: 12 • Maximum speed restriction: 90 km/h • Restricted from driving vehicle with manual transmission if practical test completed in automatic vehicle
Full licence	<ul style="list-style-type: none"> • One year of Provisional licensure 	<ul style="list-style-type: none"> • Maximum BAC limit: 0.05% • Maximum demerit points: 12 • Restricted from driving vehicle with manual transmission if practical test completed in automatic vehicle

5.2.2 The new Graduated Driver Training & Licensing (GDT&L) system

The new and current licensing system underwent a staged introduction, with the full model taking effect by February 2002. In March 1999, a new testing method was introduced for the practical driving assessment, known as the PDA. In February 2001, the Learner minimum age was lowered to 16 years and divided into two phases, with successful

¹ That is, if over 17 years, either a private or professional supervisory driver could accompany the Learner.

completion of the PDA required to progress to the second stage at a minimum age of 16 years 6 months. The requirement for professional instruction if under age 17 years was removed, while the Provisional period was extended to two years, from a minimum age of 17 years through to 19 years. No exemptions were allowed due to older age of commencement at any phase/stage; i.e. the new licensing system requirements and restrictions became applicable to all new drivers. A logbook system to record 25 mandatory driving hours during the second Learner phase was introduced in August 2001 and a Hazard Perception Test (HPT) to progress to the Provisional licence was introduced in February 2002.

Combined, these changes formed the new system known as Graduated Driver Training and Licensing or GDT&L. The model now departs from the standard three-stage GDLS and particularly differs from other systems by situating the PDA during the Learner phase rather than at the time of applying for the Provisional licence. The pre-conditions to progress to each phase/stage of the GDT&L model and the associated requirements and restrictions are summarised in Table 5.2. In addition to these, neither Phase 1 nor Phase 2 Learners are permitted to drive in Kings Park.

Supporting materials are available at each of the main licensing stages, although only the *Learners log book* is routinely issued at licensing centres. Other materials that can be requested (all free of charge) or accessed on the web include, *Getting your driver's licence* (<http://www.dpi.wa.gov.au/licensing/publications/gdtlbrochure.pdf>), *Drive Safe Handbook* (<http://www.dpi.wa.gov.au/licensing/publications/driversafebook.pdf>), *Drive Safe Candidates' Guidelines to Passing the Driving Assessment, Behind the Wheel* (http://www.officeofroadsafety.wa.gov.au/Facts/behind_the_wheel/index.html) and *Hazard Perception Test booklet: Your guide to the Hazard Perception Test* (<http://www.dpi.wa.gov.au/licensing/publications/hpt.pdf>). Applicants are considered to be aware of these resources primarily via word-of-mouth.

The aim of the GDT&L system is to extend the time periods for driving under lower-risk conditions, both during the Learner and Provisional periods, with a particular aim to increase the amount (and variation) of supervised driving experience undertaken during the Learner period (via the extended time and logbook system). The staged assessments, particularly the PDA and HPT, were designed to be difficult to pass without extensive driving experience (Drummond, 2001).

The first graduates from the fully-implemented GDT&L system started to come through the system in February 2003. Accordingly, an evaluation of the effectiveness of the GDT&L is in progress by the Injury Research Centre. A population-based study will be conducted with a pre-GDT&L cohort included for comparison purposes. This research will examine data from five cohort years prior to introduction of the new model (1998, 1997, 1996, 1995, 1994) and two cohort years following the introduction (2002, 2003). Five hundred Learners will complete an initial questionnaire then be followed up by telephone at the time of the PDA and HPT, and at 12 and 24 months following licensure. On-road behaviour and testing outcomes will be examined in light of age at first licensing and level of supervised experience. Outcome measures will include indicators of behaviours counter to road safety, such as crashes, violations, demerit points and suspensions. The research will examine not just individual risk factors but combinations of these, including for example, additional risk associated from zero to 0.02% BAC. Licensing data are processed each week in order to identify participants who have reached each milestone.

Table 5.2 The GDT&L system in Western Australia

Licensing phase/stage	Pre-conditions	Requirements/Restrictions
Learner Phase 1	<ul style="list-style-type: none"> • Minimum age 16 years • Successful completion of eyesight test • Successful completion of road law knowledge test 	<ul style="list-style-type: none"> • Must be accompanied by supervisory driver, licensed for a minimum of four years on same class of licence as Learner permit • Must display <i>L</i>-plates on front and rear of vehicle • Maximum BAC limit: 0.02% • Maximum speed restriction: 100 km/h • Restricted from driving on freeways
Learner Phase 2	<ul style="list-style-type: none"> • Minimum age 16 years 6 months • Successful completion of practical driving test 	<ul style="list-style-type: none"> • Must be accompanied by supervisory driver, licensed for a minimum of 4 years on same class of licence as Learner permit¹ • Must display <i>L</i>-plates on front and rear of vehicle • Maximum BAC limit: 0.02% • Maximum speed restriction: 100 km/h
Provisional licence	<ul style="list-style-type: none"> • Minimum age 17 years • Satisfactorily logged 25 hours driving experience on Learner Phase 2 permit • Successful completion of hazard perception test² 	<ul style="list-style-type: none"> • Must display <i>P</i>-plates on front and rear of vehicle • Maximum BAC limit: 0.02% • Maximum demerit points: 12 • Restricted from driving vehicle with manual transmission if practical test completed in automatic vehicle
Full licence	<ul style="list-style-type: none"> • Two years of Provisional licensure 	<ul style="list-style-type: none"> • Maximum BAC limit: 0.05% • Maximum demerit points: 12 • Restricted from driving vehicle with manual transmission if practical test completed in automatic vehicle

1. That is, for example, manual or automatic car licence.

2. Exemptions apply for candidates who live further than 100 km from the nearest HPT testing facility.

Notably, however, data for the pre-introduction period may be limited in this capacity. This is due to Police and licensing databases existing only in terms of current records, not historical records. For example, the databases will not identify suspensions or demerit points that have lapsed, or detail the history of a driver who had a previous licence cancelled but has since returned into the system on a new licence. Therefore, errant behaviours will be under-represented. This deters the conduct of valid research on important historical records. An additional concern is that the repeated contact may influence the progression of the Learners through the system. Any effect will be difficult to quantify in the context of the research. The evaluation results are due during 2005 to 2006. In the absence of evaluation results, the GDT&L changes are viewed as strengths of the new system by the agencies interviewed. The more graduated nature, extended time, logbook and testing requirements are viewed as important steps towards breaking the nexus between gaining a licence and misconstrued confidence in driving ability. However, concerns emerged as to whether the objectives of the new system were being met. The following section examines these and other concerns by each of the individual features and components examined in the GDLS literature.

5.2.3 Assessment of GDT&L components based on the literature

Learner components

Extending the supervised Learner period

WA has partly implemented this initiative in the GDT&L model by lowering the minimum age for a Learner permit from 16 years 9 months to 16 years, while maintaining the Provisional age of 17 years. However, the studies finding benefits of this initiative in other jurisdictions extended the Learner period to two years rather than one only. Moreover, no minimum Learner period has been mandated in WA. Therefore, it is still possible to pass through the two Learner phases in a short time with minimal experience. Information supplied by the Injury Research Centre shows that from 5 February 2002 to 5 February 2003, more than half of all new drivers spent 47 days or less in Phase Two (with 128 spending less than one week in Phase Two). It appears that once drivers have reached the minimum licensing age (17) there is little incentive to stay in Phase Two and gain more experience. Thus, the two phase Learner system does not appear to be achieving its goal of increasing the amount of supervised driving experience (at least in Phase Two).

Nearly all interviewees believed there was enough anecdotal information to suggest that young people are not utilising the new system to gain more supervised practice as planned, with many expressing their disappointment. The absence of any mandatory minimum period and the smaller number of logbook hours mandated compared to both the 60 hours debated in the discussion paper process (which was lower again than levels recommended in the literature) and compared to that mandated in other Australian jurisdictions were perceived as ineffective in promoting the importance of supervised driving experience.

Mandating a minimum holding period for the Learner Phase 2 permit was raised as an important initiative for future revisions of the GDT&L by several agencies, with two specifying six months. The Road Safety Council (2002b) also requested a compulsory

minimum period be introduced for this licence phase. Currently, the minimum ages that are applicable to this period represent a six-month range (i.e. minimum ages of 16 years 6 months for the Learner Phase 2 permit and 17 years for the Provisional licence). Mandating six months as a minimum period would be in line with the minimum periods mandated for Learners period in all other Australian jurisdictions, with the exception of South Australia (and the Northern Territory if undertaking the CBTA option), and in New Zealand and the majority of North American jurisdictions. Setting a minimum holding period is also less likely to raise equity issues associated with age-based minimums.

Notably, however, some time would still be required on the Learner Phase 1 permit and this time is also important in gaining experience for the PDA. Consideration was therefore given as to whether a mandatory minimum for this phase or a proportion of a six-months mandatory minimum across both phases should apply to this period. However, early research showed that the majority of Learners were spending the majority of their Learner candidature in Phase 1 (on average 200 days prior to the PDA) rather than Phase 2 (on average 58 days prior to the HPI) (Kirov, 2002). One agency indicated some preliminary research suggests that about 85% of WA Learners undertake some supervised practice during the 8-9 weeks prior to their PDA. Moreover, research suggests that most Learners undertake some professional instruction, with most taking lessons in the period prior to undertaking the practical assessment (Harrison, 1999; Harrison, Triggs, Wheeler & Fitzharris, 1997). Therefore, it is rare for no unsupervised practice to be gained during this period and considered non-problematic if combined with a mandatory six months during the period when more varied experience will be likely in order to meet logbook requirements. Therefore, no recommendation to mandate a minimum Phase 1 period is made at present, although details from the GDT&L evaluation will determine whether this recommendation should be revised

This should not suggest, however, that mandating a six-month minimum period for the Learner Phase 1 permit would not provide additional benefits. Rather it is considered impractical to introduce this requirement in conjunction with the six-month minimum period for the Learner Phase 2 permit in the current climate. This could be reassessed, however, once a minimum Learner Phase 2 period has been in place for some time and evaluated for its effectiveness in increasing experience (in addition to subsequent crash effects).

Notably, if introducing a mandatory Learner Phase 2 period (and not a Phase 1 period), it would be important not to downplay the importance of the Phase 1 period. Supporting education should identify that, at present, this period is under-utilised and much more practice is needed during this period to improve safety once gaining Provisional licensure.

Also of note, indications from Royal Automobile Club of WA insurance records suggest there is no evidence that the increased Learner period has resulted in increased crashes, with very few incidents during this period. Rather, the Provisional period is problematic. From their experience, they believe a longer lead in period to Provisional licensure will reduce insurance claims.

Mandatory supervised driving hours

During Learner Phase 2, a logbook specifies that 25 hours of supervised driving must be accumulated, with the recommendation to include driving on freeways, highways and/or major roads, at speeds between 80-100 km/h and at night, as well as a general

recommendation to gain experience in as many different weather conditions as possible. It includes a section on rules of use, which gives details of the *L*-plate and supervisory driver. Another section also refers to the 100 km/h maximum speed restriction, but there is no mention of the 0.02% BAC limit for Learners, although this is later stressed in relation to the Provisional period (notwithstanding that this is included among the conditions endorsed on the Learner permit itself). The logbook requires recording of the date, time of day, duration and location of the drive, odometer readings, vehicle number plate, road, weather and traffic conditions, and supervisors' details, including their signature for each trip. Both the primary supervisor and Learner must also sign the logbook for submission, which acts as a Statutory Declaration of their driving experience. The logbook states that "Penalties exist for contravening the conditions" but these are not detailed. Early reference is made to the high risk associated with driving while fatigued, although this seems to be in the context of long trips (i.e. rather than everyday driving, such as after work etc). A later section refers to the need to drive safely, yet this is focused on the Provisional driving period. Feedback from Licensing centres around the state has suggested there is a need to simplify the logbook information, i.e. details of how to complete it, and increased space to enter the required information, and therefore a revision is planned.

It is understood that originally 60 hours was proposed for the mandatory minimum driving hours. This was effectively half of the 120-125 hours preferred (and recommended in road safety literature) but believed to be less likely to be accepted. At one stage no hours were to be mandated, as it was perceived to be unviable for young people in remote areas and other disadvantaged individuals who had difficulty accessing supervisory drivers and/or vehicles. Eventually, a compromise was reached with the 25 hours. (Note that the Learner Driver Assistance Scheme attempts to address this issue.)

In addition, it was understood that originally specific conditions in which to gain supervised experience were also stipulated but were not mandated due to the vast differences in level of urbanisation, road networks, and weather conditions across the state. For example, some areas may not have substantial rainfall over a six-month period (target length of Learner Phase 2), and some remote areas do not have nearby built-up areas in which to gain experience at roundabouts or in heavy traffic, for example. Therefore, gaining some experience in a variety of conditions such as these is only encouraged, rather than mandated. Anecdotally, interviewees from one agency reported that they had noticed Learners driving in the rain, at night and in heavy traffic more often than pre-GDT&L.

Most agencies expressed concern regarding the logbook system, both in regard to the lower number of hours mandated (compared to the proposed 60) and the inability to "prove if log books are fudged". Anecdotally, it is known that misleading entries are made that may not be identified with the current process. Parents have admitted signing entries, saying they believe their child is ready. There is also a perception that many Learners want to achieve the 25 hours as soon as possible, with some taking a few single, long trips to and from towns with long straight roads and little in-traffic experience. Parents also report that they are happy to supervise this driving, but then take over as they approach the city (e.g. the drive from Geraldton to Perth). Notably, a few interviewees suggested that, while only stipulating 25 hours, the logbook recommended 100-120 hours should be the aim; however, this is not the case. Rather the logbook suggests the more experience gained the better preparation for the HPT. This provides little understanding that hundreds of hours rather than tens of hours are needed to be safer; that is, to reduce risk when driving unsupervised. Learners should be more strongly encouraged to log all driving hours, not just the 25 hours.

There was a suggestion that other states receive records of 80 to 150 hours of actual experience in their logbook systems. This is a change that is wanted.

Penalties for both Learners and supervisory drivers have been set for providing false or misleading statements in logbooks, however, these are not advertised or detailed in supporting education materials and to date no penalties have been issued. In practice, the logbooks are scanned when presented at the Licensing authority to check for implausible entries, such as: the timeframe in which all experience was gained is too short; high number of kilometres or long timeframes in single trip; or mismatches in kilometres and timeframes in single trips. If irregularities are identified, they are brought to the attention of applicants and they are told that they need to reapply with additional appropriate entries of on-road experience. In some cases, they may be told to start again from scratch. If there are ambiguous cases that are difficult to determine whether they are likely to be accurate, supervisory drivers who have signed the entries in question may be contacted for verification. DPI keeps the logbooks and includes in their records the logbook number, the satisfactory completion of 25 hours and the date the logbook was submitted.

The Road Safety Council (2002b) has requested an increase in the compulsory logbook hours to ensure that Learners achieve more driving experience. Increasing the mandatory minimum driving hours to the 120 hours recommended in road safety literature is unlikely to be acceptable; however, there is strong support for the originally discussed 60 hours. In conjunction with a mandatory minimum Learner Phase 2 period of six months, this can readily be achieved for the vast majority of drivers. Moreover, once Learners and their parents get into the routine of the Learner driving for regular activities (i.e. school, sports, shopping etc), it is likely that many more hours can be achieved in line with recommendations. As noted earlier, a high level of parental involvement in Michigan resulted in Learners achieving an average of 75 hours experience, even though only 50 hours were mandated – therefore, 150% of mandated hours (Waller et al, 2000).

Moreover, driving in a range of different conditions can be achieved throughout WA, regardless of locality, such as driving at night or in dark lighting and driving at different times of the day. These could be stipulated and other localised conditions be stipulated for those living within acceptable distances, such as driving in built-up areas, on rural roads and in wet weather. At minimum, 10 hours of the 60 hours could be required at night as found in several North American jurisdictions.

Notably, Georgia mandates 40 hours supervised driving experience for Learners and 10 hours at night for Provisional drivers. From one perspective, this can be viewed as an extension of the logbook system into the Provisional period. This is another option that could be explored for the WA context. It may be possible to reach the preferred target of 120 hours supervised experience if a proportion of this was to take place during the Provisional period (e.g. at night and with peer passengers) while allowing some lower-risk unsupervised experience.

There is a need for improved education/training of both professional instructors and private supervisory drivers in this area. There is currently a lack (Australia-wide) of much-needed guidelines on how to gain a large number of practice hours through everyday activities and how to structure this experience (Engström et al, 2003); that is, regarding which conditions pose the greatest risk, what skills are required to address these and how to best structure and graduate the learning experience in light of these (Berg et al, 2004). This could include for example: driving in daytime darkness conditions, prior to driving at night; driving with no additional passengers to increasing additional passengers; or driving on weekday evenings

and nights prior to weekends. Also lacking is information on how to assess when the Learner has developed sufficient skills at lower levels before progressing to subsequent levels. Competent handling of a vehicle is only a first step and can be greatly misleading in determining preparedness for higher-risk situations. Structured learning should commence during the Learner Phase 1 period and continue through Phase 2, preparing the young driver for the transition to a Provisional licence.

Such an initiative is supported by recent research in a US jurisdiction that found providing parents with educational materials was effective in positively influencing newly-licensed drivers' road safety behaviours (Simons-Morton et al, 2003). The Checkpoints Program intervention comprised a video, a contract-style agreement to be made between young drivers and their parents and a follow-up newsletter. The information provided focused on driving risks for novices, advantages of completing the agreement, and sections for families to set rules, consequences, and driving limits on driving with peer passengers, at night and on high speed roads. The materials encouraged families to set initial limits on the scope of unsupervised driving and gradually relax them over time. Follow-up showed this approach was successful in positively influencing driving experience up to four months later, with support for some aspects of the program still evident nine months later.

Notably, one agency favoured the return of a previous series of workshops conducted by Police. The focus was not just about what road safety is, in terms of regulations and the like, but why it is important; for example, not just mandatory BAC limits but the effects of different BAC levels on functioning and not just seat-belt requirements but the consequences of non-use of seat-belts in the event of a crash. It was also suggested that there was too much focus in general on the 'Big Four' road safety issues (speeding, drink-driving, seat-belt non-use and fatigue) and not on other important risk behaviours such as not stopping at stop signs, overtaking when unsafe, red light running, chasing behaviour, spinning wheels and non-use of signals.

Also of note, at least two interviewees expressed concern that 16 years was very young to commence driving experience. This may also be a concern of parents. While some parents may rightly decide that their child is not ready for such experience, others must be reassured that the Learner period is an extremely low risk period – lower than during any subsequent driving phase. The learning period can be a stressful time for both parents and Learners, especially in the early stages (Harrison, 2003). It might be useful to remind parents in such guidelines that professional instructors can be of value in early stages for establishing basic vehicle-handling skills so that parents can be more comfortable when first acting as supervisors. Too often professional instructors are seen as a resource to pass the practical driving test required only at the very end of the learner period (Fitzgerald & Harrison, 1999).

Supervisory driver requirements

The GDT&L system addresses the need for supervisory drivers to be sufficiently experienced in order to supervise Learners by requiring that they have a minimum of four years experience on the same class of licence as the Learner. For drivers licensed under the new system, this equates to a minimum age of 21 years, in line with several US jurisdictions and older than in other Australian jurisdictions besides Victoria, which has an equivalent minimum age of 23 years.

The system does not as yet legislate a BAC restriction for supervisory drivers, however. This allows for such a driver to be intoxicated, and therefore unable to provide adequate

supervision for the novice. It is understood that a common problem resulting from this loophole is that some parents when intoxicated use this as an opportunity to ask their Learner son or daughter to drive them home, from the pub for example, particularly in rural areas where there are few alternative options such as public transport.

This loophole was closed in Victoria as recently as 2001, where a less than 0.05% BAC limit is mandated, while a less than 0.05% BAC limit applies in New South Wales. It is understood that a less than 0.02% BAC limit is under consideration for WA. This may need to be achieved by introducing legislation to deem a supervisor to be a driver. Note that WA has faced a complication before with regard to who is a legal supervisory driver when more than one person is seated in the front of the vehicle (following a crash in which two were present). This was achieved by defining supervisory drivers on the basis of their seating position (stipulated on the permit as 'seated beside' the Learner unless others are seated in the front, for example on a bench seat, in which case it is the person seated at the outermost front passenger seat).

In addition, the regulations do not require the supervisor to have a good driving record, such as Tasmania, which requires no disqualification in the previous two years, or in Sweden which sets a limit on demerit points they can have accumulated. Requirements such as these aim to ensure the supervisory driver is a responsible driver. These could also be considered for the WA context. The possibility that certain groups may be disadvantaged by such a measure would need to be addressed. One agency expressed concern that currently there are no guidelines on how to choose an appropriate supervisor. At minimum, guidelines should be developed with reference to drivers with a good driving record included.

Professional instruction

Since the introduction of the GDT&L system, there is no requirement for compulsory professional instruction. The driver-training industry is concerned with this change and believes they have an important role when commencing the learning period. It is believed that very few (about 2-3%) of Learners currently start to drive in this way, while about 55% of applicants for the PDA attend with a professional instructor (at both metro and rural licensing offices).

There is no support in the literature that a mandatory period is necessary, although this may assist parents in early stages to be more comfortable supervising their Learners. One agency believed there was still a role for professional instructors in teaching young people about the importance of stopping distances, merging into traffic and the dangers of weaving in and out of traffic. One interviewee noted that, at least anecdotally, current instruction rarely addresses these specifically, nor road safety attitudes – i.e. being a safe, responsible driver. These are important lessons to include in certification processes for professionals.

Processes that encourage early licensure

Currently, Learner permits are issued for 12 months only, with an additional 12-month permit able to be issued for each phase, at no extra cost. Notwithstanding the possibility to extend, this can imply that 12 months is generally an ample period and inadvertently encourage Learners to apply for their Provisional licence by the end of that year, rather than have to renew their permit. WA could consider introducing a longer validity period, such as the three years applicable in New South Wales, South Australia and Tasmania, or even longer.

The GDT&L does not allow earlier licensure due to education/training initiatives and this is supported by the literature. One interviewee did suggest that there is some concern the link between the Road Aware Pre-Driver program with acquiring a Learner Phase 1 permit prior to the mandatory minimum age will encourage earlier licensure. This is less likely to be problematic if the Learner commences at the minimum Learner age and uses the twelve-month period available to gain much and varied driving experience.

Provisional components

Extending the Provisional period

WA has implemented this initiative in the GDT&L model by increasing the Provisional period from one to two years. This, together with Learner requirements, effects a minimum age for full licensure of 19 years. In five other Australian jurisdictions (i.e. the majority), the minimum Provisional period is three years and the minimum age for full licensure is 20 or 21 years. Therefore, there is still potential for this period to be extended even further without appearing out of line with other Australian systems.

Note that in the Australian Capital Territory, if drivers undertake a CBTA option during the Provisional phase, they do not need to display *P*-plates. This provides an incentive to participate in the program. If considered a community concern, an extension of the Provisional period may be better accepted if drivers were exempt from displaying *P*-plates during this additional year (perhaps when first introduced and possibly removed at a later stage). This would necessarily need to be supported by mandatory carriage of licence regulations.

Night-time driving restrictions

Currently, the GDT&L system does not include any night-time driving restrictions. While these are clearly associated with fatality and injury reductions for young people in New Zealand, the US and Canada, young people in these jurisdictions can start to drive unsupervised at somewhat earlier ages than Provisional drivers in WA; from as young as 15 years 3 months in Florida to 16 years 6 months in Kentucky. Notwithstanding these lower minimum ages, of the evaluations examined in Section 3.6.2, the restrictions applied to all new drivers in New Zealand, Canada and Maryland, and all new drivers under 18 years of age in the other US states¹. Therefore, there is clear overlap with the WA minimum Provisional age of 17 years. Seventeen-year-olds were among those for whom significant crash and/or injury reductions were achieved in New Zealand, California, Florida and Nova Scotia.

Moreover, these night-time driving restrictions for Provisional drivers most often apply for between six to 12 months (see Table 3.6), which, if applied to the GDT&L system, would be equivalent to minimum ages of 17 years 6 months to 18 years. It is likely that these shorter periods of restrictions, compared to two years as in Nova Scotia, for example, would be less controversial to introduce than for the full WA Provisional period (which extends for two years and, therefore, a minimum age of 19 years) but still show significant benefits.

¹ This also varies in other US states, such as in New Jersey where the minimum age for exemptions is 21 years (IIHS, 2004).

Careful analysis of WA young driver crash patterns by the time of day is necessary to best target the problem hours. It may be found, for example, that majority of fatalities and injuries occur after midnight and not during the earlier restricted hours of 9 or 10pm through to midnight. Further research and developments would also be required in relation to appropriate exemptions and penalties.

Nearly all agencies raised night-time driving as an issue of concern and believed restrictions should be considered for future GDT&L developments. At minimum, targeted education on the risks of night driving, especially with peers, should be undertaken with greater options made available, such as night buses and other community buses (such as those at pubs and clubs that will operate during all opening hours), which the Office of Road Safety have found are well-supported. This supported by EU research (see review by Engström et al, 2003) and also by recent US research that found positive behavioural outcomes based on an education program more specifically targeting parents of young drivers (Simons-Morton et al, 2003).

As noted earlier, Georgia's GDLS, which mandates 40 hours supervised driving experience for Learners and 10 hours at night for Provisional drivers, can be viewed as an extension of the logbook system into the Provisional period without being viewed necessarily as a night-time driving restriction. This option could be explored for the WA context.

Peer passenger restrictions

Currently, the GDT&L system does not include any passenger restrictions, notwithstanding the finding that peer passenger restrictions are considered highly effective by expert researchers. Application in WA, therefore, merits consideration, with further research required on current patterns of peer passenger carriage and crash and injury rates. As noted in relation to night-time driving restrictions, notwithstanding lower minimum ages in overseas jurisdictions where passenger restrictions are deemed successful, the restrictions apply to all new drivers in New Zealand and all new drivers under 18 years of age in the US. Therefore, there is clear overlap with the WA minimum Provisional age of 17 years. Seventeen-year-olds were among those for whom crash and/or injury reductions were achieved in California and New Zealand, and were included in the US estimates of fatality reductions by Chen and colleagues.

Nearly all agencies raised the issue of driving with same-aged passengers as an issue of concern and one they believed should be considered for future GDT&L developments. Current penalties and/or demerit points were perceived as insufficient to address the intentional risk-taking that can be evident in the presence of peers.

Further research and developments are needed to further direct recommendations on the scope of restrictions, as well as appropriate exemptions and penalties. As noted earlier, it may be that a restriction to one peer passenger only or restrictions only at night could target the majority of fatalities and injuries of young drivers and their peer passengers. While some WA research has shown increased risk with passenger carriage, this was with passengers of all ages and did not control for exposure. Therefore, the findings established in the US and elsewhere have not yet been clearly established in WA. Again the possibility of an extended logbook-type period as in Georgia requiring a minimum number of supervised hours carrying peer passengers might be found to be viable.

Notably, while many existing systems, such as that in New Zealand, include exemptions for family members and other conditions of purposeful driving (e.g. for work purposes), the

Police raised concern regarding this possibility in WA. They cautioned that they had witnessed several incidents and serious crashes involving groups of young people including siblings (both in metro and rural settings). Developments in this area should address this issue. It may be necessary to stipulate the purposeful nature of the trip as a condition if family members are present.

Vehicle power restriction

The GDT&L system does not include a vehicle power-weight ratio restriction for Provisional drivers. A local consultant examined this issue in the WA context during 1994-5 based on research in Australia and other countries such as Sweden. There were no supporting research evaluations then and there is still no clear research support for this initiative being effective in reducing young driver road trauma. There is however strong community support and support from the Police, who believe it could readily be enforceable by requiring the power-weight ratio to be displayed on the vehicle registration sticker.

While the initiative is not considered to necessarily be counter-productive, it may raise equity problems in WA, where young drivers in remote communities may primarily have access to four-wheel-drive vehicles only. An investigation of the relationship between vehicle power-weight ratios and the crash involvement of 17-19 year-old Provisional drivers in WA is currently in progress at the Injury Research Centre. The research will investigate crash patterns and make recommendations for WA's GDT&L system.

Alternatively, WA has recently introduced what is known as "hoon legislation", which targets the illegal speeding and drag races associated with high-speed vehicles. Under the Road Traffic Amendment (Impounding and Confiscation of Vehicles) Bill 2004 (State Law Publisher, 2004), Police and the courts can impound the vehicle driven by an offender in certain circumstances. The Bill amends the definition of "reckless driving" to include any offence of speeding by 45 km/h or more in excess of the posted speed limit and introduces "circumstances of aggravation" for the offences of dangerous driving causing death, dangerous driving causing bodily harm, reckless driving or dangerous driving. Circumstances of aggravation "include those in which offences are committed when racing another vehicle, attempting to establish or break a speed record on a public road, speed-testing a vehicle, or creating excessive noise and smoke by doing what is commonly called a burnout." Provisional drivers convicted of an aggravated offence face a licence suspension for three months and must also reapply and resit the required tests before regaining their licence. In addition, if the Police "form a reasonable suspicion" that a person has committed an offence in circumstances of aggravation, they are able to impound the offender's vehicle immediately for 48 hours. If convictions are made for the same offence three times, the vehicle can be sold (although if it is another person's vehicle – the same each time – the vehicle can be impounded for six months but not sold).

Warnings, stricter penalties, good driving record and lower demerit point threshold initiatives

The GDT&L model does not include a system of warning letters, a specific good driving record requirement, nor a reduced demerit point threshold for Provisional drivers, but does include some stricter penalties. More serious offences can result in automatic cancellation of a Learner permit or Provisional licence, such as driving unsupervised (as a Learner), excessive speed and drink-driving (0.02% BAC or above). One agency called for other

serious offences, including intentional risk-taking behaviours or committing the same offence repeatedly also to result in licence cancellation and that cancellation should require recommencement of the entire Provisional period. Another option raised was double demerit points for repeat offences. One agency also noted that WA sets minimum and maximum penalties for certain offences, while other jurisdictions set maximum penalties only, and that this latter approach was preferred.

It is understood that a reduced demerit point threshold initiative is under consideration in WA. Currently, of 48,118 Provisional licensed drivers in WA, 4,691 have demerit points with some 2,000 having more than five demerit points. A reduced demerit point threshold would target this latter group by providing an incentive not to accumulate additional points once approaching the threshold, and might, therefore, reduce this number who would otherwise face licence suspension under such an initiative. While representing only a small proportion of Provisional drivers (4.2%), this is a considerable number of young people who are not complying with regulations and compromising their own and others' safety. Note that one interviewee spoke of a secondary school student who had already accumulated 11 points. This again confirms the need to target the most risky drivers by reducing the threshold to an appropriate level for WA.

Based on their findings that first-year drivers in WA have far greater risk of being involved in a crash and of incurring a traffic infringement and conviction, and that these offences are predictive of serious injury crashes, Palamara et al (2001) recommended that fewer demerit points be allowed during the first year of Provisional licensure. Metropolis (2004b) has proposed that the demerit point threshold be reduced for Provisional drivers such that only three points can be accumulated during the first year of Provisional licensure and seven points for the total two-year Provisional licence period before licence disqualifications apply. This contrasts with the current allowance of 12 demerit points over a three-year period (as applies to fully-licensed drivers). If four or more points are accumulated in the first year or twelve or more points during the total period, the licence should be cancelled for three months, while if 8 to 11 points are accumulated during the total period, the licence should be suspended for three months.

Notably, two agencies expressed concern that current stricter penalties for offences might be lost if a reduced demerit point threshold was effected. This has been true of certain offences in Victoria, for example, where the restriction to one passenger following a licence disqualification and the extension of the Provisional period by the length of suspensions were effectively lost once the threshold was reduced. Careful consideration of the impact of a reduced threshold is needed so that important initiatives already in place are not lost by over-riding new regulations.

In general, interviewees suggested there was a fairly low understanding of penalties in the community, and that further education is required to more effectively motivate young people (and others) to drive safely.

Extension of Provisional period following licence suspension

Currently, the GDT&L does not include the regulation of extending the Provisional period by any periods of licence disqualification. This effectively results in the most risky drivers being subject to the lower-risk restrictions for a shorter period than other Provisional drivers.

Learner & Provisional components

Age-based exemptions from restrictions

The GDT&L system has addressed the need for all novices to be subject to the benefits of the system by not including age-based exemptions from restrictions. This is important given that inexperience is the main contributing factor to crash involvement, over and above the major contributing factor of young age.

Zero BAC limit

Currently, the GDT&L system allows for 'restrained drinking' by mandating a less than 0.02% BAC limit, rather than a zero limit. While this is promoted as 'zero tolerance', it does not send a clear message that no alcohol should be consumed prior to driving; that is, it is not about managing or controlling alcohol consumption but abstaining altogether when driving (Chamberlain & Solomon, in press). Metropolis (2004a) has reported that, at least anecdotally, very few people in WA appear to know what quantity of alcohol can result in a BAC reading of 0.02% and therefore asserts that it is far less confusing to require novice drivers not to consume alcohol at all. He recommended that Provisional drivers be subject to a zero BAC level and that this be clearly communicated to young drivers.

In WA, more than one-tenth of crash-involved Provisional drivers record an illegal BAC (0.02% or greater). Moreover, compared with more experienced drivers, a greater proportion are involved in crashes at lower BAC levels (up to 0.079%) (Palamara et al, 2001). As noted earlier, about one-third of all drink-drivers are repeat offenders with the majority being male (90%) and under age 25 years (65%), and with repeat offenders having 2.3 times greater crash risk than drivers without drink-driving offences (Featherston et al, 2002). Therefore it can be argued that current systems to address drink-driving are not adequate for young drivers.

Several interviewees suggested the main reason for the reduced but not zero limit was concern that convictions at a low BAC level would be thrown out of court by magistrates due to the need to allow for alcohol in medicine or food sources for example, and therefore simply waste resources. It is understood, however, that other jurisdictions avoid this complication by mandating a zero limit but enforcing this with a tolerance for traces of alcohol that may be accountable by such sources (e.g. 0.01% or 0.02%).

One interviewee suggested the Provisional drivers are leading the way in this area by calling for a zero BAC themselves.

Mandatory seat-belt use

This is a Federal regulation rather than a GDT&L requirement and clearly beneficial. There is some indication in other jurisdictions, however, that usage rates are lower for young drivers and particularly their passengers. The benefits of this regulation could be reinforced in safety behaviour information and guidelines included in GDT&L supporting materials (as currently included regarding fatigue, for example, which is not linked to any specific GDLS initiative).

Maximum speed and freeway restrictions

The GDT&L system addressed concerns in the literature over potential disbenefits of mandating a reduced maximum speed restriction for Learners and Provisional drivers. Previous restrictions were removed for Provisional drivers and raised to the more compatible level of 100 km/h for Learner drivers.

The small reduction for Learners has not been evaluated, but is unlikely to be problematic compared to the more discrepant lower speed of 80 km/h, for example. Learners are still able to drive on high-speed roads and are encouraged to gain experience driving on freeways during the Learner Phase 2 period under supervision.

Some concern was expressed regarding the restriction from Phase 1 Learners from driving on freeways. Based on the information obtained in the interviews, it appears that Learners currently spend little time gaining experience during this phase, with the majority of experience gained in Phase 2. This will be important to check as part of the GDT&L evaluation. On one hand, the restriction sends the message that there is a need to gain experience at lower speeds prior to high speeds. On the other hand, the restriction prevents Learners from gaining experience on safer roads.

Local research is required to assess current patterns of Learner driving exposure and crash involvement on high-speed roads to see whether revision of this initiative is required.

Towing restrictions

The GDT&L system does not include restrictions on towing, but requires *L* and *P*-plates to be displayed on the trailer as well as the vehicle. It is understood that there was some discussion in WA regarding introducing restrictions, but that these were not enacted due to the very low levels of towing that actually occurs. The literature is inconclusive as to potential benefits of restrictions. Further research is needed before any changes to legislation can be supported.

Testing requirements

The GDT&L now incorporates knowledge, practical and hazard perception tests to comprise a system requiring graduated training in order to achieve progressive licensure. The knowledge test was recently approved to be undertaken on-line, to include a verbal option, and for a range of translations and translators to be available. No information was obtained regarding the psychometric properties, validity or reliability of the test.

The practical test is now positioned within the extended supervised driving period rather than as an endpoint to the Learner period. In this way, it reduces the potential for Learners to undertake test-focused instruction only. The revision to the PDA introduced in March 1999, changed to the system of receiving points for correct behaviours, rather than deducting points for incorrect behaviours, in line with recommendations in the literature. In addition, rather than instructing the applicant as to where to drive and when to turn and the like, it now establishes a real-world scenario where the applicant is required to undertake a drive in order to complete a specific task (e.g. to recover a wallet left at a friend's house the night before). Pre-selected sites are audited in metro and rural locations. Details and examples are included on the Licensing website. The focus is on several key competencies, which can be practiced and scored in a practice test version provided.

PDA assessors are Licensing personnel in metro areas, contract staff in large but not major towns and Police in small remote towns. Exemptions apply for candidates who live further than 100 km from the nearest testing facility. The former groups are trained on the new PDA (which comprises a 50-minute drive) to the same level, whereas the Police still administer the previous system (a 30-minute drive assessed via a checklist of incorrect behaviours). The latter is an easier task to pass; however, there is a high turnover of Police in these locations, which has implications for training.

Some interviewees voiced concern that some applicants who know the Police assessment process is easier are able to choose this rather than the new PDA. It is understood that the Commissioner wants Police to be no longer involved; however, some Police reported liking this non-enforcement role in remote communities.

According to the Office of Road Safety, the WA HPT was designed to assess Learners' ability to scan the traffic ahead, assess potential hazards and react appropriately. A post-implementation review of the HPT identified several areas where improvements were required (Kirov, 2002). These included: the detailed nature of the instructions; failure of feedback content and number of feedback messages to discriminate between those participants passing the test and those failing; unclear, non-specific recommendations included in the content of messages; no clear explanation of the purpose of the feedback; items not randomly presented within a given test form; concern with the quality of night-time and motorcyclist-related items; a low pass mark requirement (currently less than 50%); and the possibility that one test form was more difficult to pass than others. Ensuring that the test is valid and reliable is essential and, if this is achieved, such that passing is related to safety, the pass mark requirement must also reflect that the applicant has adequately acquired the appropriate skills (i.e. not fall below 50%) before the applicant can progress to the unsupervised Provisional licence.

There is no direct evidence available (from WA or elsewhere) that shows whether learners who gain more supervised driving experience before attempting the HPT perform better on the test. DPI data show that learners who sat the HPT within 2 months of passing the PDA were less likely to pass than those who sat the HPT 3-4 months after passing the PDA. However, learners who sat the HPT more than 4 months after passing the PDA had a lower pass rate.

Currently, applicants who fail the HPT can reapply the following day. Both the review and material provided by DPI suggest that applicants who fail are not gaining enough, if any, additional experience before reapplying. DPI data show that the average score for each attempt and the average pass score for each attempt decreased as the number of attempts increased. The average time between all attempts at the HPT was only 3.7 days. Interestingly, the average time between attempts was longer for learners who passed the test at the later attempt than those who failed (4.2 versus 2.8 days).

A mandatory minimum period before they can reapply will send a clear message that more practical experience is required in order to pass the test. It is understood that originally there were plans to remove the requirement to wait until the next day, such that candidates could reapply the test on the same day, but these plans were not implemented. Alternatively, some additional mandatory driving hours could be required to be logged before reapplying, more clearly targeting the message that more practical experience is what is needed to best prepare for the test. Applicants must pay each time they sit the test. This also provides a financial incentive to be well prepared.

It is understood that there was always notionally an exit test planned for the GDT&L system. It was reported that the system includes a continual reviewing process based on monitoring of research supporting the effectiveness of particular initiatives. If a suitable, effective test was available it would be included dependent on funding and Political implications. Without an exit test, or at minimum some education materials addressing this transition, it is implied that drivers are now well-skilled, competent drivers. The new, higher-risk conditions in which they can now drive as a fully-licensed driver (e.g. at an increased BAC level) are not addressed.

Education, instruction and training

The GDT&L does not include any compulsory, standardised professional instruction, education or training program that all drivers must complete. Such experience must be acquired, however, in order to complete the PDA, the logbook requirements and the HPT. There is currently no clear support for introducing such an initiative, although there has been a recent push by the Federal government, with pressure on all the states and territories to comply. If such programs were to be enacted, they should be based on ‘best practice’, as reviewed in Chapter 2, with new alternatives examined, such as the initiatives from training programs for fleet drivers (discussed in Section 3.8.3).

Display of *L* and *P*-plates

The Road Traffic (Drivers’ Licence) Regulations 1975 (State Law Publisher, 2004) currently mandates the display of *P*-plates, while Regulation 266 of the Road Traffic Code requires the display of *L*-plates. However, while it is compulsory to carry the Learner permit when driving, the current legislation does not require mandatory carriage of licence (Provisional or full licence). This limits the ability of Police to enforce restrictions if no *L* or *P*-plates are displayed and no permit or licence is produced (discussed further in Section 5.3.1).

When the GDT&L system was in planning, there was some discussion regarding the need for different coloured *L*-plates for the Phase 1 and 2 periods. This was not considered necessary on the balance of costs versus benefits. There was also concern about how to regulate the requirement in terms of whether penalties should apply if a driver was displaying the wrong coloured plates. The main distinction for enforcement purposes is the freeway restriction for Phase 1 Learners. It was concluded that there were other mechanisms to enforce inappropriate behaviour on freeways; that is, for illegal or reckless behaviour, and for driving less than 20 kms below the posted limit unless the freeway is congested or some other such reason. If other important distinctions were made during this period, there would be a greater need to distinguish drivers at the two different licensing phases.

If two phases of Provisional licensure were introduced, it would also be necessary to introduce different coloured plates, given the much greater differences in restrictions proposed and the need to maximise compliance in order to achieve maximum benefits.

Other GDLS considerations

Social acceptability & community support

Interviewees suggested there was currently strong community support for initiatives to address young driver-related road trauma. The GDT&L legislation was perceived as easy to implement at the time, as young drivers were a priority issue. One interviewee indicated that community support was a pre-requisite for changes in legislation, particularly in the regions, and therefore equity issues were paramount. High community acceptance was evident in relation to the recent introduction of “hoon” legislation, for example. It was also believed to be necessary to know that the general public was convinced that intended changes would address a real need or real issue and that such needs or issues were directly relevant to them. Currently, it is perceived that the general public are of this view in relation to licensing regulations, but not necessarily young people as a community group.

This stresses the need to correct the common misperception or misinterpretation by young drivers (and others) that measures are implemented to directly address irresponsible behaviours (only). Rather their everyday driving puts them at greater risk due to their inexperience, as is true for all new drivers, regardless of whether they are conscientious or indeed irresponsible drivers (although risk will be greater again for the latter). Moreover, young driver crashes do not only involve young people or passengers of young drivers, but also include multiple-vehicle crashes and crashes involving other road users. Any initiatives to reduce their crash involvement should be promoted as relevant to all road users.

Surveys conducted by the Royal Automobile Club of WA (RAC) indicated there was general community support for the GDT&L system, particularly the lengthening of the Learner period, and that they favoured the discussion of issues that was promoted in the process of establishing the changes. RAC members surveys total about 445,000, with a distribution that is similar to the WA population in terms of metro: rural split (about 80%: 20%), although is perhaps higher in socioeconomic status and has a greater proportion of elderly members. Therefore, the members’ surveys give some indication of current community perceptions in WA by, albeit, a specific cross section of the community

A 2003 members survey showed support for several initiatives:

- 74% supported peer passenger restrictions for the first six months of the Provisional period: comprising only 36% of 16-24 year-olds compared to 88% of those over 65 years.
- 56% supported a night-time driving restriction between 10pm to 5am for the first six months of the Provisional period: again representing only 36% of 16-24 year olds compared to 88% of those over 77 years.

Through the RAC community education program of road safety talks in schools, surveys were also conducted with participating secondary school students. Of 675 Year 10, 11 and 12 students, the following survey results were found:

- 80% disagree that “P-platers should be banned from driving between 10pm and 6am” (8% agree)
- 53% agree that “Passengers can influence a driver’s ability to drive safely” (15% disagree)
- 59% disagree that “P-platers should be able to drive powerful cars” (18% agree)
- 50% disagree that “Blood Alcohol limit for P-platers should be zero” (26% agree)

-
- 66% disagree that “I can drive safely if I have been drinking” (11% agree)

There was some concern expressed regarding the ability to enforce peer passenger laws and of the likely acceptance by those affected. There was also concern about the practicality and impact of night-time driving restrictions. Interestingly, this contrasts with the US findings of greater support for night-time driving restrictions than for peer passenger restrictions (see Section 3.9.1).

There are also political timeframe factors that can affect the likelihood of implementing new initiatives. Changes must be made in line with community support but also within an appropriate time during a term of office. From this perspective, it is important to emphasise that overseas research shows support for GDLS restrictions is generally high, but also that support increases further once the restrictions have been place for about a year or so, including by young people affected by the system; by which time it is likely that research will demonstrate that young lives were saved and a considerable proportion of injuries reduced.

Notably, there was some indication, however, that even among the agencies with a direct interest in the GDT&L, the changes were not very well known or understood. This was despite recognising that documents relating to the process were likely to have been received but not necessarily digested or well-disseminated. This included some members of the Police, which has important implications for enforcement measures. One interviewee believed that the agencies needed better education, as well as the community in general, and suggested only those community members immediately involved in the graduated licensing process, that is, those applying for a licence or their parents as supervisory drivers, would have a better understanding of the changes that had been implemented. This not only referred to the legal changes but the reasons why changes were made and what they hoped to address, with one interviewee commenting, “the nuts and bolts of this is that I don’t really think people understand what it’s all about”.

Impact on mobility and equity issues

Stakeholders raised a number of mobility and equity issues relating to driver licensing in remote communities. Given the lack of trained Licensing personnel or contractors in small remote towns, learners are being tested by Police officers on the previous PDA, rather than the new PDA and are exempt from the HPT requirement.

It was noted that there have always been difficulties for applicants from remote indigenous communities to obtain a drivers licence, but that the new system made this harder. In particular, there is sometimes poor access to qualified supervisory drivers or vehicles. It was noted that being unable to obtain a drivers licence often featured as a step in an escalating cycle of illegal behaviour: the need to drive for transport results in being apprehended by Police; the person cannot drive to the location to pay the fine, and so on. Thus a suitable licensing system is needed for both mobility and social equity reasons.

Some stakeholders described alternative licensing programs for remote communities. There is a pilot program to develop more user-friendly system for remote communities in Warburton, Port Hedland and other areas. The need to develop partnerships with all stakeholders in region/local to identify issues and local solutions was noted.

The Learner Driver Assistance Scheme assists Learners who have limited access to supervisory drivers and/or vehicles, which impacts on their ability to accumulate driving

experience. Parents and other eligible supervisory drivers in the community are enlisted to volunteer to supervise the Learners. It is understood that there has been some difficulty implementing this initiative due to insurance companies wanting to increase premiums of supervisory drivers' vehicles that are not insured for young drivers.

Other concerns raised in interviews

Database difficulties

A major barrier to research and developments in young driver safety relates to problems with the quality of relevant databases, inability to link information from different databases and access to certain data.

The main Licensing and Police-reported databases are updated chronologically, such that historical records are not included. That is, for example, information regarding the Provisional driving records of a now fully-licensed driver may not be available (e.g. demerit points that have lapsed). Moreover, not all records are linked, although Licensing is in the process of a major upgrade that is being rolled out statewide and will now link all their relevant data into a combined system (e.g. licence test performance records).

Additional problems with Police-reported crash data, is that passenger details are only included for injured passengers. Moreover, passenger age is not routinely recorded, limiting the ability to determine crash patterns or evaluate initiatives involving young drivers carrying peer passengers. Notably, these difficulties are experienced in other states, such as Victoria and New South Wales (Haworth, 2003; Lam 2003).

Difficulties also arise from the different ways in which crashes are included or not included in various databases. For example, the road into the international airport is regarded as Commonwealth land (although it is enforced by WA Police) and not the responsibility of Main Roads. Crashes on this road are recorded in Main Roads' database but not always included in the reports to the Office of Road Safety. It is understood that fatalities always align, but not necessarily injury or non-injury crashes. Crashes can be categorised into three main groups: include as a clear statistic, a clear non-statistic (e.g. the crash occurred off-road) or as a non-statistic based on Police agreement with Main Roads. The Office of Road Safety is currently investigating the possibility of data sharing with stakeholders, such as Main Roads and the Police under a memorandum of understanding. This has not progressed as planned, however, an agreement has been achieved on the need for a transparent and accessible system.

Alternative transport options

Other concerns raised, primarily in relation to night-time driving restrictions, related to the limited availability of public transport alternatives in certain areas or at certain times. Currently, some buses stop operating at 10 pm. There has also been a call for more trains at specific times, but no government money to support such an initiative. Interviewees indicated their was limited transport available not only in remote areas but in general outside the Perth area. One explained that recently taxi regulations had to be mandated to ensure there were enough taxis to service a town some 40 km north of Perth.

There is a concern that night-time driving restrictions will result in young people needing to walk to their destinations and that this will compromise their safety, especially for young

girls. One interviewee suggested there was some evidence of a peak in crashes at 3 am due to young people returning from clubs. A midnight bus was trialed on an established bus route with the option to depart from the route to an individual's house; however, it was not well supported. With a driving restriction in place, there may be greater demand for such a service. It is encouraging that such a system has been in place and should therefore be easier to reintroduce.

Currently, a designated driver or skipper program is encouraged, as well as other options such as staying at friends' houses, using other forms of transport or not drinking when driving. This has included an educational initiative regarding how to manage consumption to remain under the BAC limit. For example, a variety of glasses marked to indicate standard drinks have been promoted in pubs and clubs. This raises concerns that peer passenger carriage is actually encouraged when research has clearly linked this to increased risk for young drivers. In addition, managing alcohol consumption is generally a difficult task and unsuccessfully applied in many cases (e.g. Senserrick, Hoareau, Lough, Diamantopoulou & Fotheringham, 2003).

5.3 Other young driver regulatory systems

5.3.1 Police enforcement and GDT&L

From the Police perspective, the Police do not undertake enforcement programs focused solely on breaches of GDT&L regulations, but rather enforcement of the regulations interacts with other operations. They believe the main interaction occurs when young people are occupants in crash-involved vehicles or those pulled over for erratic or dangerous driving. There are some specific issues relative to speed and drink-driving enforcement, which are addressed in the following sections.

One overarching concern of the Police in relation to GDT&L is that currently, while the Learner permit (paper only) must be carried at all times when driving, there is no mandatory carriage of the Provisional or full licence (both photo identification). Moreover, if requested, the driver only needs to present a licence "when practicable". This can allow, for example, a driver undertaking a long trip, or reporting such, to avoid presenting a licence at a Police station for some quite some time.

The implication of this for the GDT&L system is that it can be impossible, in some cases, to determine what type of licence the driver holds if no *L* or *P*-plates are displayed and no permit or licence is presented. Therefore, the Police can be limited in their ability to enforce certain restrictions that apply to Learner and Provisional drivers but not fully-licensed drivers. In addition, this limits the ability of the Police to know whether the driver indeed has a licence or has had their licence suspended or cancelled or is on an extraordinary licence that stipulates a 0.02% BAC limit or even whether the vehicle is stolen. This can allow young drivers (and others) to avoid appropriate charges and penalties.

Compulsory carriage of licence legislation was recommended by Metropolis (2004a, 2004b) following his review of road traffic penalties in WA. Interviewees suggested that earlier concerns regarding ethical issues relating to mandatory carriage of licence are mostly now resolved. The Police are also in support. Currently, during random breath testing operations, if drivers look young and are not displaying *L* or *P*-plates, the Police might do a quick radio check to determine their licence status. If mandatory carriage was introduced, they would recommend a system whereby all drivers should automatically have their licence

ready to show at the time of the test. They believe this will not add undue time to their operations.

An additional concern for Police is their current inability to determine the current total of an individual's demerit points during a licence check, due to limitations in their database access. This has important implications for on-road enforcement situations in which Police have a discretionary role in determining an appropriate penalty for an offence. While they aim to target high-risk drivers, as can be indicated by a higher number of demerit points, this information is not readily available.

5.3.2 Speed enforcement

With advances in technology, much of Police speed enforcement now occurs electronically and automatically via use of multanova cameras. Under this system, speed offences are detected and a penalty notice issued to the owner of the vehicle without personal contact with the driver; indeed in many cases without the knowledge of the driver prior to receiving the notice (often some 3-4 weeks later). This system requires the owner of the vehicle to nominate who was driving at the time of the offence, such that the identified individual will be allocated the associated demerit points.

As it is known that young drivers often drive a parent's vehicle, this system has the potential to allow young drivers to avoid penalties if their parents are willing to adopt the penalty, particularly in circumstances when the young driver is otherwise in jeopardy of losing his/her licence. However, there have been some widely publicised cases in WA, where individuals who have fraudulently nominated other drivers have been found guilty and sent to jail. The Police report that it is well known that those who attempt to cheat the system will be caught and prosecuted and do not believe that this scenario is a major problem in WA.

A related problem to this is that currently owner-onus does not apply to the automatic speed infringements, as it does to parking fines, for example. This is problematic in cases involving company vehicles, for example, where a driver may avoid the fine if the company cannot identify who was driving the vehicle at the time of the offence. This also allows the potential for young drivers (and others) to escape appropriate charges and penalties.

Another concern to Police regarding speed enforcement is the reduction in hours of on-road Police presence resulting from the use of automatic electronic speed cameras. This compromises the ability of the Police to address individual drivers regarding the nature of their offence and the associated risks. This also allows for them to take into account the circumstances surrounding the offence and allow a reduced charge or warning to be issued. This may be particularly important for young and novice drivers who tend to underestimate such risk, may commit offences due to inexperience, and may benefit from a personal warning.

5.3.3 Legal age for alcohol consumption and enforcement of the less than 0.02% BAC limit

In WA, the legal age for alcohol purchase and consumption in licensed premises is 18 years. Therefore, from a strictly legal perspective, for young people progressing through the GDT&L system at the minimum age thresholds, the overlap between legal drinking and legal driving occurs one year into the Provisional period. For those licensed at older ages, this can occur earlier, including during the Learner period. In addition, as is true of other

Australian jurisdictions, the alcohol regulations that apply to licensed premises have no legal status within the home. Therefore, appropriately, a BAC limit (<0.02%) is regulated for both the Learner and Provisional stages.

As noted above, there are no targeted enforcement programs to address this BAC limit specifically, but it is addressed in general enforcement programs, albeit in a somewhat limited manner due to the absence of mandatory carriage of licence regulations.

Other alcohol-related regulations include penalties for suppliers of alcohol to minors or intoxicated individuals, for false identity documents, for being intoxicated on a licensed premise, and for 'street drinking'. The latter is interpreted by the Police as having an open container of alcohol in a non-licensed public place and is variably enforced (e.g. it might be overlooked at a family picnic but not by youths walking through a public park).

If a drink-driving-related incident occurs, Police can investigate information provided on the location and supply of the driver's last drink, although it is unclear how well or how routinely this information is used. If sufficient evidence is obtained regarding the role of others in providing alcohol to an underage or already intoxicated individual who later causes an injury crash (for example), those involved can be taken to court for their contributory role in the incident.

There is some concern that in cases where alcohol has been served to very obviously intoxicated individuals, this is not customarily followed up by the Police. More targeted enforcement by the Police of specific licensed premises where such activities are known to occur is required. Currently, there is clear incompatibility between obvious drunkenness occurring and charges made against licensees. A greater level of (targeted) enforcement is needed. Consistent with this is the associated need to raise the perceived threat of detection within the industry.

There is a range of other alcohol control measures (including those addressed in Section 4.2.3) that can be put in place not to focus on alcohol per se but on drunkenness. There is some evidence that extended trading hours (i.e. late night trading), for example, contribute to problems with drunkenness. Currently, in WA, a change in community acceptance of drunkenness is needed through general education campaigns and a range of alcohol control strategies.

5.3.4 Extraordinary licences

Extraordinary licences are sometimes granted to enable drivers who have lost their licence by disqualification or suspension to continue to drive for specific purposes. The stakeholders consulted expressed concern that the practice of issuing extraordinary licences served to undermine the deterrent value of penalties (for both young drivers and other drivers).

5.3.5 Driver licence penalties for non-traffic offences

Drivers licences can be suspended as a penalty for unpaid fines. Stakeholders commented that they thought that this practice led the public to view licence suspension as a less serious penalty than if it were reserved for driving offences only.

5.4 Likely impact of Arriving Safely responses

The GDILS system was developed and implemented prior to the introduction of Arriving Safely, the WA Road Safety Strategy for 2003-07. Arriving Safely does not specifically target improvements in young driver safety but states that these will come about as a result of the Strategy responses of Countering Drink Driving, Reducing Speeding, Increasing Restraint Use Improving the Effectiveness of Enforcement, Improving the Safety of Roads, Protecting Vehicle Occupants and Reducing Travel Speeds. These responses will improve road safety outcomes for young drivers not only by influencing the crashes in which they are at fault but by preventing or reducing the severity of crashes involving young drivers for which other, more experienced drivers are responsible.

GDT&L contributes to Countering Drink Driving to the extent that the zero BAC limitation is effective. The effect of this restriction could be increased if police checked licences at RBT and therefore increased the deterrent value of this restriction.

There is scope to increase the contribution that GDT&L can play in reducing speeding. Currently, the number of demerit points that can be lost by novice drivers is the same as for fully-licensed drivers. A reduction in the demerit point threshold for losing the provisional licence would potentially be effective in further deterring speeding by young drivers.

5.5 Summary of issues and concerns regarding the current situation in Western Australia

Two major driver-training initiatives for young people in place in WA are both voluntary pre-driver programs conducted through secondary schools; namely, the Road Aware Pre-Drivers program (although this is primarily a driver education rather than training program) and the YDDP. These programs operate in addition to those of an extensive number of driving schools throughout WA that provide services for learning to drive and/or defensive and advanced driving programs. The Royal Automobile Club of WA also provides road safety presentations at secondary schools, although coverage and details are limited.

Concerns regarding the Road Aware Pre-Drivers program are that its voluntary nature and its effectively different format in each school will make interpretation of evaluation results difficult. Its effectiveness may also vary dependent on the age mix of participants, with the ability to obtain a Learner Phase 1 permit many months in advance effectively separating any learning from actual on-road experience. There is also some concern that linking the program with the GDT&L system will encourage earlier licensure, which must be addressed.

Preliminary research on the effectiveness of the YDDP did not find evidence for a change in road-safety-related attitudes over time. There is some concern that the country-based focus of the program might result in limited variety of any driving experience achieved. There was also concern regarding the young age of 15 years at which participants were driving, that is, below the legal Learner age. Other concerns related to possible self-selection issues and regarding the current political opposition party establishing a platform to implement the program across the state.

Primary concerns with the GDT&L system are that the potential for an extended Learner period and increased driving experience are not being fulfilled, with a particular concern regarding a perceived prevalence of invalid logbook entries, despite road safety agencies' perceived need for an increase in the minimum logbook hours to at least the 60 hours

proposed originally. There was also concern that limited variety in experience was being achieved. Penalties for invalid logbook entries have not been publicised nor enacted and therefore provide limited incentive to comply. There is no systematic provision of supporting resource materials, although these are readily available.

Other concerns related to the limited regulations regarding supervisory drivers, particularly the lack of a BAC limit, and to whether mandatory professional instruction should be re-introduced. It was suggested that the 12-month validity period of Learner permits might encourage licensing after this period, rather than extending the Learner period further. There is also potential for the Provisional period to be extended further.

Common concerns about the Provisional period were that it does not currently include any restrictions to address the increased risk associated with driving at night and with peer passengers, particularly multiple passengers. Many also questioned the lack of vehicle power restrictions, although there is not yet support for these in the literature. Concern was also expressed regarding the absence of a reduced demerit point threshold. At present, licence suspensions reduce the period of on-road driving time available for the most risky drivers.

While the BAC limit is lower for Learners and Provisional drivers, there is potential to reduce it further to a zero limit. The benefit of the Learner Phase 1 freeway restriction was questioned. Some problems have been identified with the current HPT and with the ability to resit tests after a negligible period of one day. The absence of an exit test was also noted.

There was some indication that the community, especially young people, did not currently understand the aims of GDLS restrictions, particularly the role of night-time and peer passenger restrictions nor the high risk of crashes and injuries associated with driving in these conditions. Moreover, some agencies also lacked a clear understanding of changes implemented with the new GDT&L system.

Problems regarding equity issues were raised in relation to disadvantaged groups and remote communities in particular. The GDT&L was perceived as increasing the difficulty of gaining a licence for individuals in these groups. Poor public transport or access to alternative transport was a major concern. Limitations in available databases that reduce the ability to clearly assess and address relevant issues were also identified. There have been difficulties initiating the Learner Driver Assistance Scheme due to insurance companies wanting to increase premiums of supervisory drivers' vehicles that are not insured for young drivers.

In relation to other young driver regulatory systems, concerns focused on the lack of mandatory carriage of licence regulations and vehicle owner onus for automatic speed infringements. There is also concern regarding the reduced on-road Police presence and the inability of Police to access data regarding driver infringements/demerit points during such enforcement.

More targeted enforcement by the Police of specific licensed premises where obvious drunkenness occurs and raising the perceived threat of detection within the industry is needed. A change in community acceptance of drunkenness is also needed through general education campaigns and a range of alcohol control strategies.

Chapter 6 RECOMMENDATIONS FOR WESTERN AUSTRALIA

6.1 Driver-training programs

Road safety education programs that are conducted in a classroom-based environment (only) within the school system have not been found to be effective in reducing young driver crashes and injuries in published evaluations. Some that encourage early licensure have been counterproductive.

The Road Aware program differs from most of the programs in these evaluations, in that there is the potential for great variation in the content and delivery of the program and there is a clear, measurable behavioural aim, namely increased hours of supervised experience (in addition to other outcome objectives of the program). It is essential that the evaluation determine both the number of hours of supervised experience and the duration of the period in which the experience is gained.

The cohort-based study of the Road Aware program will evaluate differences in supervised driving hours, which, as argued in Section 2.4, is likely to be a more appropriate outcome measure of program effectiveness than any crash-based evaluations.

It may be possible for age at time of participation to be identified and evaluated to determine whether there are differential effects for the youngest and oldest participants. This would be useful information for further changes to the program.

The Office of Road Safety should examine the evaluation results and recommendations, and provide support to any initiatives that increase the amount and varied nature of supervised driving experience that Learners achieve over longer time periods.

The evaluation of the YDDP should provide useful guidance regarding potential future changes to this program. The road safety literature suggests the skid control component of the program is likely to be negative. The focus on safety and defensive driving, however, is an important focus. The Office for Road Safety should be attentive to the evaluation results and recommendations and follow in accordance with 'best-practice' driver-training guidelines.

6.1.1 Implications for policy developments based on the literature

Approaches to driver training that focus on development and enhancement of higher-order skills within a driver licensing framework are emerging as likely methods of improving young driver safety. Notwithstanding these findings, however, the literature also indicates that other initiatives are known to be effective in reducing young driver crash and injury risk to a greater extent than is likely with driver training only. The review therefore highlights several implications for future policy developments both to improve driver training effectiveness and to support other young driver initiatives that are known to be effective.

- Primarily, support should be given for initiatives to enhance both the depth and breadth of driving experience obtained as a Learner driver under supervision. This is the clearest single protective factor against crash involvement as a novice. Private supervision can be

effective in achieving this and can be complemented by professional instruction; however, better guidelines are needed for supervisory drivers.

- Exposure reduction restrictions, such as the night-time and peer passenger restrictions, are likely to be far more effective in reducing fatalities and serious injuries of young drivers and passengers than short-term driver training programs and these should be given priority over compulsory driver-training programs.
- To be most effective, driver-training programs should be incorporated into a graduated driver licensing system and the role of parents and other interested adults should be maximised. New and innovative programs in this regard should be supported over traditional programs.
- Support should be given for driver training initiatives situated within the driver licensing system that address higher-order skills, both attitudinal-motivational issues and cognitive-perceptual skills according to 'best-practice' methodologies.
- 'Best-practice' driver-training methodologies are self-paced, extend over a long period of time and cover a comprehensive range of driving situations. They should demand active participation, consider personal experiences, attitudes, emotions and motivational orientations, allow for reflection and not only identify risk, but allow young drivers to actually experience risk, associated emotions and personal shortcomings.
- Driver-training programs should include theory sessions, including small group, peer discussions, integrated with practical exercises (at off-road facilities) that demonstrate adequate stopping distances and following distances necessary for safer, everyday driving.
- These recommendations are based on the current state of knowledge. Future research and developments in driver training should be monitored to assess whether any of the recommendations above should be changed.

6.2 Graduated driver training and licensing system

First it must be recognised that, given the size of WA, range of weather conditions, terrains, road networks and community groups, including remote communities with reduced access to facilities and resources (including vehicles and supervisory drivers in order to gain driving experience), no one system is likely to be perfect for all young people across the state. Therefore, it is necessary to apply a system that will benefit the majority of people, with alternative programs or, in some cases exemptions, for specific individuals or community groups. Such an alternative is already under development to accommodate the current licensing system, with supporting hardship legislation recommended (e.g. Metropolis, 2004a, 2004b). These issues need careful consideration in light of any changes to the current system.

Based on an examination of the literature in relation to the current situation in WA, a number of recommendations are made. Given that important evaluations are underway, however, outcomes of these evaluations should be monitored and implications for the following recommendations assessed. Likewise, any future research and developments should be monitored and evaluated and revisions made accordingly.

6.2.1 Initiatives for the Learner period

In order to increase the amount of supervised driving experience gained during the Learner period and to reinforce its role as a safe practice period, the following initiatives are recommended:

- Mandate a minimum period of six months for the Learner Phase 2 permit. This should be supported by education that addresses the importance of this period without downplaying the importance of the Phase 1 period. Assessment of this initiative and results of the GDT&L evaluation should be monitored to determine potential benefits of revisions, including the introduction of a mandatory minimum period for the Learner Phase 1 permit. None is recommended at present.
- Increase the mandatory minimum driving hours to at least 120 hours (the level research shows is needed to reduce crash risk when first licensed). Increased parental involvement should be encouraged.
- Mandate that certain driving conditions be included in logbooks, such as 10 hours driving at night for all drivers, in addition to recommending that driving occur in a variety of conditions (e.g. wet weather, urban and rural settings), where this is possible.
- Revise logbooks such that they clearly stress the message of the need to gain over a hundred hours rather than tens of hours of driving experience to be better protected as a Provisional driver and more strongly encourage Learners to log all driving hours. They should clearly detail restrictions and safety messages during the Learner as well as the Provisional period. Odometer readings allow for checks of likely accuracy and should be retained. Penalties for misleading entries in logbooks should be detailed to better motivate appropriate entries. Guidelines should include advice on appropriate supervisory drivers (e.g. those with good driving records).
- Ensuring systems are in place that ensure applicants are aware of supporting resource materials available to them at each licensing phase/stage.
- Supporting research and development of better guidelines for supervisory drivers on how to gain many hours of practice, how to best structure the learning experience, which conditions pose greatest risk, and how to determine when the Learner is ready to graduate to higher risk conditions.
- Mandate a zero, or below 0.02% or 0.05% BAC limit for supervisory drivers, as found to be acceptable in the WA context. Explore the possibility of introducing a good driving record requirement, such as minimum period without licence disqualifications or demerit point limit.
- Review and potentially revise current qualification processes for professional instructors to determine the extent of risk or hazard perception training and attention to road safety attitudes. There is currently no support for re-introducing compulsory professional instruction.
- Introduce a Learner permit that is valid for a longer period (e.g. 3-10 years).
- Ensure no changes in driver education, training or other initiatives result in earlier licensure.

6.2.2 Initiatives for the Provisional period

The following initiatives are recommended to increase safety and reduce fatalities and serious injuries of WA Provisional drivers:

- Support further research and developments regarding the introduction of a two-phase Provisional period (as in place for the Learner phase) with a first phase of six months including additional restrictions on driving at night and with peer passengers, with appropriate exemptions and penalties in place.
- Develop targeted education on the increased risk associated with driving at night and with peers and improve access to alternative options, such as night buses and other community buses.
- Consider increasing the Provisional period from two to three years in line with the majority of Australian jurisdictions, potentially initially with an exemption from displaying *P*-plates during the additional year (in conjunction with mandatory carriage of licence regulations).
- Await recommendations from current WA research project on the potential effectiveness of introducing vehicle power restrictions (currently no research to support introduction of this initiative).
- Retain stricter penalties for offences, lower the demerit point threshold (as an indication of a good driving record) and support developments to introduce a system of warning letters. Carefully consider which current penalty initiatives might be compromised by reduced threshold regulations and ensure that important initiatives are not lost in this process.

6.2.3 Initiatives for both the Learner & Provisional period

- Retain the exclusion of age-based exemptions from restrictions, such that the GDT&L requirements and restrictions apply to all new drivers.
- Introduce a zero BAC limit for all Learner and Provisional phases (albeit with a Police tolerance of 0.01% or 0.02%).
- Reinforce the importance of seat-belt use in reducing the risk of fatalities and injuries in the event of a crash in supporting GDT&L educational materials.
- Maintain the lack of heavily-reduced maximum speed restrictions for Learner and Provisional drivers. Support and monitor research on the pattern of Learner driving exposure and crash involvement on high-speed roads in order to determine whether the freeway restriction for Learner Phase 1 drivers should be revised.
- Support and monitor further research regarding the effectiveness of towing restrictions for Learner and/or Provisional drivers. Currently, no change is required based on the limited and inconclusive nature of research regarding this initiative.
- Assess the psychometric properties, validity and reliability of the knowledge test and review and evaluate accordingly.
- Revise current HPT in light of identified problems affecting its validity, reliability and practical value (given the low pass mark requirement and ability, if failing the test, to reapply the next day).

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- Encourage the use of the revised PDA where staffing allows. Support alternative licensing programs for remote communities to provide a means of obtaining a licence and reducing unlicensed driving and its legal and road safety consequences.
 - Support further research and developments of exit tests and educational materials to mark the transition to a full licence, in terms of their effectiveness in improving post-licence safety.
 - Prioritise initiatives to gain much and varied experience as a Learner and additional exposure-reducing restrictions for Provisional drivers (i.e. at night and with peers) over and above any traditional driver-training programs linked to licensing. New, innovative programs should follow ‘best-practice’ guidelines, as discussed in the present report. Research and developments into alternative programs based on fleet initiatives should be supported.
 - If additional requirements or restrictions distinguishing the two Learner phases or a new system of two Provisional phases were introduced that required distinction for Police enforcement, display of different coloured *L* and/or *P*-plates should be mandated to distinguish the different phases (in addition to penalties for non-display).
 - Support further research and developments regarding a mobile phone restriction prohibiting all use (including hands-free systems).
 - Ensure age and size of vehicle recommendations are included in supporting guidelines/educational materials distributed at each licensing stage.
 - Support research and developments into targeted initiatives for young driver recidivists.
 - Monitor Intelligent Transport Systems developments pertaining to licensing and safety and support research and developments into their potential role in GDT&L and young driver education and training, guidelines and other supporting materials.

6.2.4 Other GDT&L initiatives

- Increase public awareness, including road safety agencies and political parties, of the young driver problem and how licensing initiatives aim to address these. This should highlight circumstances representing greatest risk, especially driving in recreational circumstances, at night, with peer passengers and with alcohol in their system. A focus should be that these initiatives aim to address young driver inexperience; that is, they are not punitive measures for intentional, irresponsible behaviour. Rather the latter needs to be targeted by additional initiatives, such as a reduced demerit point threshold and penalty revisions.
- Reinforce to the community that improved young driver safety has benefits for everyone in the community; not just young people.
- Support initiatives to improve public transport availability and alternative transport options. Licensing changes that restrict driving should particularly be supported by night-time and community bus programs.
- Support developments to improve the quality of and access to relevant databases (e.g. crash, licensing and registration) to maximise their usefulness in enforcing, monitoring and evaluating GDT&L and other young driver safety initiatives.

6.3 Other young driver regulatory systems

- Support initiatives to increase the perceived threat of detection and enforcement of GDT&L regulations, such as targeted publicity and penalties, some (limited) highly visible Police enforcement, such as a transitional ‘amnesty’ period where warning letters (rather than monetary fines or demerit points) are issued.
- Support the introduction of mandatory carriage of licence regulations.
- Support improvements to Police database access to allow records of drivers’ licence penalties to be accessed during roadside licence checks.
- Support the introduction of vehicle owner onus for automatic speed infringements.
- Support initiatives to increase Police on-road presence (in addition to automatic enforcement programs).
- Support initiatives to increase targeted Police enforcement of licensed premises where obvious drunkenness occurs.
- Support initiatives to increase the perceived threat of detection of illegal serving of alcohol within the industry.
- Support initiatives to change community acceptance of drunkenness through general education campaigns and a range of alcohol control strategies.
- Monitor and evaluate the effectiveness of any changes and revise accordingly.

Chapter 7 Concluding comments

A key issue in the debate regarding young driver regulatory systems is whether it is a privilege or a right to have a driver licence. Community perspectives on this issue influence which GDLS components are considered acceptable, including the age at which unsupervised licensing can commence and the penalties or restrictions imposed for offences, including licence cancellations and potential reissue processes. There may be no one system that is perfect for all individuals and community groups within a given licensing jurisdiction. In the case of WA, this includes covering a vast geographical area and range of weather and living conditions. While it may not be desirable to develop systems that include exemptions or differential requirements for certain individuals or groups, these can be necessary to achieve the overall aim of greater safety for all road users.

Notably, there is currently a Federal push for driver training for all novices. It is also politically appealing to both of WA's main political parties. The present review confirms that the benefits of driver training and what constitutes 'best-practice' are not yet established. Where benefits have been found, these are smaller than the comparatively significant gains found for increased driving experience as a Learner and night-time driving restrictions for Provisional drivers, as well as the potential gains offered by peer passenger restrictions. Moreover, night-time driving and peer passenger regulations, for example, can be simpler and less costly to enact (i.e. predominantly via administrative changes) in comparison to regulations for driver training, which would require the development of an appropriate program, necessary facilities and materials, training of instructors and so on. From these perspectives, such changes to licensing regulations are encouraged over and above the current push for driver-training programs, with appropriate support by other young driver regulatory systems, such as Police enforcement.

Enhancing the effectiveness of current young driver regulatory systems in WA has the potential to work together with Arriving Safely to improve road safety outcomes for young drivers. Together, these initiatives can prevent or lessen the severity of crashes involving young drivers, as well as their passengers and the other road users with which they interact.



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Appendix A Road Aware Pre-Drivers Keys for Life Program

Overview

Aims of the *Keys for Life* program

The *Keys for Life* program aims to prepare young people for a lifetime of safer driving by:

- *developing their understanding of the importance of gaining supervised driving practice;*
- *fostering positive road-user attitudes and behaviours; and*
- *involving parents and the community in youth road safety education.*

Progress towards the *Keys for Life* outcomes will contribute to students achieving the overall program aim.

Keys for Life Outcomes

The *Keys for Life* program is focused on student achievement of three road safety outcomes that are a synthesis of the Health and Physical Education Learning Area Outcomes from the Curriculum Framework. These are known as the *Keys for Life* outcomes and describe what students should know, value and do, to become safer passengers and drivers.

Outcome 1: Knowledge of road safety issues

Students understand factors that influence the safety of road users.

Outcome 2: Skills for safer road use

Students use self-management and interpersonal skills to enable safer road use.

Outcome 3: Road user attitudes

Students understand positive road user attitudes and how attitudes towards road safety are influenced.

Essential content

This describes the crucial knowledge, skills and attitudes students must engage in, in order to maximise achievement of the *Keys for Life* outcomes.

The essential content for the *Keys for Life* program includes:

Road safety factors

- Vulnerability of young road users
- Road crash theory
- Consequences of safe and unsafe driving
- Skills for safer driving
- Risk factors
- Protective factors
- GDT&L system
- Road rules and enforcement
- Insurance

Road safety skills in practice

- Decision making
- Planning
- Communication skills
- Negotiation skills

Valuing the safety of self and others

- Influences on road safety attitudes
- The relationship between road safety attitudes and behaviours
- The importance of supervised driving
- The rights and responsibilities of drivers
- Personal safety and the safety of other road users

Learning contexts

Teachers can choose the most appropriate learning context to cater for the needs and interests of students.

Examples of contexts for pre-driver education:

- Laws and rules
- Active citizenship
- Driving and socialising
- Workplace driving
- Managing the use of alcohol
- Relationships and negotiating
- Trip planning
- Driving in different conditions
- Vehicle maintenance and safety
- Preparation for employment