

# Graduated Driver Licensing

## An international review

\*Lyndel J. Bates,<sup>1,2</sup> Siobhan Allen,<sup>2</sup> Kerry Armstrong,<sup>2</sup> Barry Watson,<sup>2</sup> Mark J. King,<sup>2</sup> Jeremy Davey<sup>2</sup>

## برنامج الترخيص التدريجي لقيادة المركبات مراجعة دولية

ليندل جوديث بيتس، سيبيوهان الين، كيري ارمسترونج، باري واتسون، مارك ج. كينج، جيرمي دافي

**ABSTRACT:** Graduated driver licensing (GDL) aims to gradually increase the exposure of new drivers to more complex driving situations and typically consists of learner, provisional and open licence phases. The first phase, the learner licence, is designed to allow novice drivers to obtain practical driving experience in lower risk situations. The learner licence can delay licensure, encourage novice drivers to learn under supervision, mandate the number of hours of practice required to progress to the next phase and encourage parental involvement. The second phase, the provisional licence, establishes various driving restrictions and thereby reduces exposure to situations of higher risk, such as driving at night, with passengers or after drinking alcohol. Parental involvement with a GDL system appears essential in helping novices obtain sufficient practice and in enforcing compliance with restrictions once the new driver obtains a provisional licence. Given the significant number of young drivers involved in crashes within Oman, GDL is one countermeasure that may be beneficial in reducing crash risk and involvement for this group.

**Keywords:** Traffic Accidents; Public Health; Accident Prevention; Safety; Automobile Driving.

الملخص: يهدف برنامج الترخيص التدريجي لقيادة المركبات زيادة تعرض السائقين الجدد إلى مواقف سيطرة معقدة والتي تتكون من مراحل رخصة المتعلم، والرخصة المؤقتة ثم مرحلة الرخصة المفتوحة. وصممت المرحلة الأولى (رخصة المتعلم) لتسمح للمبتدئين بالحصول على خبرات ممارسة القيادة في مواقف منخفضة الخطورة. وقد تؤدي رخصة المتعلم إلى تأخير الترخيص ولكنها تشجع المبتدئين على التعلم تحت المراقبة وتحديد عدد ساعات الممارسة اللازمة للترقي الي المرحلة التالية والتشجيع على المشاركة الأبوية. بينما ترسخ المرحلة الثانية لقيود وضوابط السيادة وبالتالي الحد من التعرض للمواقف عالية الخطورة أثناء القيادة مثل القيادة أثناء الليل والقيادة مع ركاب آخرين أو بعد تناول المشروبات الكحولية. وتعتبر المشاركة الأبوية عنصراً أساسياً في مساعدة المبتدئين على الحصول على التدريب الكافي وتشجيع الالتزام بالقيود والضوابط فور حصول السائق تحت التمرين على الرخصة المؤقتة.

مفتاح الكلمات: الحوادث المرورية؛ الصحة العامة؛ منع الحوادث؛ الأمان؛ قيادة السيارات.

**G**RADUATED DRIVER LICENSING (GDL) systems use a public health approach to reduce the prevalence of traffic accidents by focusing on reducing the risks for new drivers as a group, rather than the risk of individual drivers.<sup>1,2</sup> These systems minimise the exposure of novice drivers to risky situations while allowing them to obtain driving experience.<sup>3,4</sup> The purpose of GDL is to gradually introduce new drivers to more complex driving environments as they gain experience.<sup>4,5</sup> Typically, there are three stages in a GDL system: the learner phase, the intermediate or provisional stage and the full licence stage.<sup>6</sup> As new drivers demonstrate their experience during the less demanding stages, restrictions are lifted and new driving privileges are introduced.<sup>7</sup>

The learner phase allows the new driver to

develop driving skills under the supervision of a more experienced driver, while a provisional licence allows solo driving, subject to restrictions.<sup>8,9</sup> A GDL system is not designed to reduce deliberate risk-taking by new drivers. Instead, it reduces crash risk caused by inexperience.<sup>10</sup>

New Zealand introduced the first GDL system in 1987; since then, its popularity has grown, with jurisdictions within Australia, the USA and Canada also implementing forms of GDL.<sup>4,5</sup> An increasing number of evaluations indicate that this countermeasure is effective in reducing crash risk.<sup>11-14</sup> Shope *et al.* found that the introduction of GDL systems in the USA had reduced the crash risk of the youngest newly licensed drivers by 20–40%.<sup>15</sup> Even when a basic GDL system is introduced, research indicates that it reduces fatal crash involvement for

<sup>1</sup>School of Criminology & Criminal Justice, Griffith University, Mount Gravatt, Queensland, Australia; <sup>2</sup>Centre for Accident Research & Road Safety, School of Psychology & Counselling, Queensland University of Technology, Brisbane, Queensland, Australia

\*Corresponding Author e-mail: L.Bates@griffith.edu.au

16- and 17-year-old drivers when compared with slightly older drivers. Correspondingly, Fell *et al.* observed that more comprehensive GDL systems result in greater reductions in the number of crashes.<sup>11</sup> The available evidence indicates that when GDL systems only apply to drivers aged up to 17 years old, an increase in crashes for drivers aged 18 or 19 years old can occur.<sup>16</sup> Thus, there may be advantages to implementing GDL systems for older novice drivers. Research suggests that GDL programmes are beneficial both for the young licensed driver and other road users.<sup>17</sup> Evaluations of the New Zealand GDL system, which were carried out immediately after its introduction, demonstrated a reduction of 25% in the number of crashes with casualties.<sup>18</sup> However, a study carried out in the USA by Romano *et al.* found that the reduction in young driver crashes as a result of a GDL system may differ across racial or ethnic groups.<sup>19</sup>

Within the Australian states of Queensland and Victoria, the introduction of more comprehensive GDL systems has been associated with reductions in fatal and serious injury crashes.<sup>20,21</sup> Other studies in various jurisdictions demonstrated reductions in road crashes which were attributable to GDL systems; however, these reductions were not as significant in comparison to when the systems were first introduced.<sup>22,23</sup>

Road traffic crashes are an alarming public health issue throughout the world, including in Oman. This issue remains of vital concern despite the nation's on-going improvements in traffic law enforcement practices and technology.<sup>24,25</sup> One of the main target groups for road safety among the Omani population is young drivers aged 17–25 years. According to the licensing system in Oman, as comprised in the traffic laws, the minimum age to apply for a driving licence is 18 years, with an exception in some cases where the minimum age may be 17 years. A recent investigation examined the characteristics of traffic accidents in Oman involving young drivers over a three-year period.<sup>26</sup> Al-Reesi *et al.* found that although young drivers aged 17–25 years old comprise around 17% of all licence holders, they also represent more than one-third of all drivers involved in road traffic accidents in Oman.<sup>26</sup> Specifically, the authors reported that, of the total number of road crashes in Oman between 2009 and 2011 ( $n = 33,172$ ), a total of 11,101 involved a young driver. Among these, 7,727 of the young drivers (69.6%) were considered to be 'at fault' at the time of the crash.<sup>26</sup> These findings suggest that there is a need to consider programmes such as GDL in order to improve young driver safety in Oman.

While research has confirmed, to varying degrees, the effectiveness of GDL systems, there is limited evidence available regarding the mechanisms by which

they successfully reduce crashes and which particular components are the most effective.<sup>3,4,14,15,27–30</sup> However, a study by Masten *et al.* identified that requiring drivers to hold a learner's permit for a minimum of 12 months and having passenger and night-time restriction components were the most effective GDL mechanisms in reducing fatal crashes.<sup>31</sup> This review is intended to provide an update on the existing literature, with special attention given to the role of parents and restriction enforcement-related issues.

## The Learner Phase

The learner phase of a GDL system is designed to allow new drivers the opportunity to gain practical driving experience in terms of vehicle handling, assessing the road environment and observing the behaviour of other drivers, all the while under the supervision of a more experienced driver.<sup>2</sup> This phase recognises that individuals need to learn how to drive and to accumulate initial driving experience in lower risk situations with an experienced supervisor.<sup>1,8</sup> It aims to provide individuals with the experience and capabilities they will eventually need when they drive by themselves.<sup>21</sup> While the learner phase is critical in a comprehensive GDL system, it is important to note that supervised driving is inherently different from unaccompanied driving.<sup>2,32</sup> As Scott-Parker *et al.* noted, supervised driving is designed to effectively teach the new driver how to drive and to allow the development of driving experience.<sup>33</sup> The benefits of the learner phase may result from the delayed licensure, supervised learning process, mandated hours of practice and the involvement of the young learner's parents.

### DELAYED LICENSING

Delayed licensing occurs when learner drivers are not allowed to drive without supervision for a period of time. This limits learners' exposure to risky driving situations and allows them time to mature, thereby reducing crashes.<sup>34</sup> Delayed licensing can include increasing the amount of time that must be spent as a learner or raising the minimum age to obtain a learner licence.<sup>35–37</sup>

In New Jersey, USA, raising the licensing age from 16 to 16.5 years was found to be associated with a 7% lower fatal crash rate, while delaying the licensing age to 17 years was associated with a 13% lower fatal crash rate.<sup>3</sup> An analysis of fatal crash rates for 15–17-year-olds in the USA revealed that jurisdictions which allow individuals to learn to drive and become licensed at an earlier age have higher crash rates.<sup>38</sup> Additionally,

a recent study by Ehsani *et al.* suggests that a GDL system that is inclusive of all ages reduces novice driver crash risk; however, conversely, the same study concludes that a GDL system can increase the crash risk if it is only applicable to those under 18 years.<sup>39</sup>

Furthermore, the length of time that the learner licence is valid for can provide another method of delaying licensing. Learner licences that expire in a relatively short period of time may encourage individuals to become licensed near the expiration date due to the sense of urgency that the short time frame creates. Learner licences which do not expire for a significant period of time do not create this pressure.<sup>38</sup>

### SUPERVISED LEARNING

As was observed by Sagberg *et al.*, higher-order skills—such as perception, attention and judgement—develop over several years in comparison to basic motor skills.<sup>40</sup> The amount of practice required for learning to drive is currently not fully known.<sup>34</sup> Although a new driver's driving ability improves over time, it does not equal the ability demonstrated by more experienced drivers in more complex driving situations. Research suggests that learners who have more supervised driving practice have a reduced risk of crashing once they commence solo driving.<sup>7</sup>

The amount of practice undertaken by learner drivers may be affected by a number of factors. Among an investigated sample of learner drivers, these factors included increasing self-confidence as vehicle control skills improved; time constraints, including employment; the need for personal transport to and from social events; level of education, and holding a learner's licence.<sup>41</sup> Research has identified that learners fail to gain much experience in potentially higher-risk situations, such as driving in the rain or at night; however, they are usually confident of their driving abilities by the time they have reached the next stage of licensing.<sup>41,42</sup> This suggests that more hours of accompanied driving results in a more positive perception of this period, as was also noted in a study of young drivers in Israel.<sup>43</sup>

### MANDATED HOURS OF PRACTICE

Some jurisdictions require learners to undertake a fixed number of driving hours and to record these in a log book, with research suggesting that mandating a certain number of supervised practice hours increases the amount of practice undertaken.<sup>44,45</sup> In the USA, the required number of practice hours varies from 20–65 hours.<sup>46</sup> Some states within Australia require learner drivers to complete significantly more practice. For instance, learner drivers in Victoria and New South Wales must complete 120 hours, while those in

Queensland must record 100 hours.<sup>47</sup> However, in Queensland, learner drivers can record three hours within their log book for every hour completed with a professional driving instructor, for up to 10 hours of practice or 30 log book hours.<sup>33</sup> This means that learner drivers in Queensland may be able to record 100 log book hours after only 80 hours of actual practice undertaken. There appears to be little research basis for the selection of particular time limits,<sup>2,48</sup> although there is some research support for learners obtaining close to 120 hours of practice.<sup>49</sup> Additionally, jurisdictions with 50 or more mandated hours of practice have demonstrated that there are increased levels of parental involvement in the young drivers' learning process compared to those with fewer or no mandated hours.<sup>50</sup>

However, mandating a set number of hours may imply to learners that this is all the time needed to learn required driving skills.<sup>2</sup> This suggests that it is a simple task that is completed as soon as the learner requirements are fulfilled.<sup>2</sup> Nevertheless, requiring new drivers to complete a certain amount of practice may delay licensing, thus further reducing their exposure to the risk of crashing.<sup>34</sup>

While parental involvement may be positive in other areas, there are a number of potential drawbacks to involving parents in ensuring that learner drivers obtain sufficient supervised practice.<sup>51</sup> This includes the possibility that the supervised practice may lack variety and that parents may undertake many of the driving tasks requiring higher-order skills on behalf of the learner, thereby preventing the development of skills in identifying hazards and managing distractions. This concept is supported by the findings of research undertaken in North Carolina, USA, which identified that parents of teenage learner drivers focussed on teaching vehicle handling skills rather than higher-order perceptual and cognitive skills.<sup>52</sup> Other potential drawbacks include little parental knowledge of the mandated number of hours and parental perceptions of supervised practice.<sup>53</sup> A study in two Australian states indicated that many parents found the log book system to be an ineffective measure of the amount of driving practice accomplished, despite reporting that their own child's log book was accurate.<sup>54</sup> However, the use of a log book to record hours may help structure learners' driving practice, allowing other supervisors to be aware of how much the learner has practiced.<sup>55</sup>

Research suggests that log books are not completed in voluntary systems.<sup>44,55</sup> Before the act of completing a learner log book became a compulsory requirement of the GDL system in Queensland, a study found that two-thirds of participants were unaware that a voluntary log book was available for completion.<sup>42</sup>

## The Provisional Phase

An important component of effective GDL systems is limiting driving in high-risk situations for the first few months or years after a new driver receives their licence.<sup>38</sup> The provisional phase is designed to reduce a new driver's exposure to risky situations when unsupervised by limiting their driving in certain situations such as at night, with passengers or after drinking alcohol.<sup>9</sup>

Younger drivers are far more likely than older drivers to crash at night.<sup>38</sup> Night-time driving restrictions have been introduced in several jurisdictions, including New Zealand and numerous states in the USA.<sup>6</sup> Restricting late night driving for young drivers has proven effective in reducing crashes and young driver fatalities.<sup>4,56</sup> A national study in the USA suggested that, when late night driving was restricted, fatal night-time crashes for 16- and 17-year-old drivers was reduced by approximately 10% when compared with older peers.<sup>57</sup> The effectiveness of night-time driving restrictions, however, is affected by the time the restriction starts, the role of parents and the availability of exemptions.<sup>37</sup> Night-time restrictions have been shown to be more effective when they restrict driving before midnight and are still effective in reducing crashes with a 50% compliance rate.<sup>58,59</sup>

### PASSENGER RESTRICTIONS

Passenger restrictions also affect driving behaviour, both positively and negatively. For example, a study by Lee *et al.* found that drivers tend to exhibit safer driving behaviours, such as wearing a seatbelt, when they are accompanied by passengers.<sup>60</sup> The study also found that the greater the number of passengers, the greater the likelihood that safe driving behaviours would be displayed by the driver.<sup>60</sup> Conversely, younger drivers accompanied by younger passengers are more likely to cause a crash than any other age group.<sup>38,60,61</sup> One study showed that the more young passengers that were present in a vehicle, the greater the crash risk both at night and during the day.<sup>37</sup> Passenger restrictions usually mean that individuals under a certain age are prohibited as passengers, although family members are generally exempt from the restriction and are able to ride with the provisional licence holder at all times.<sup>37</sup>

Research from New Zealand suggests there is a reduction in provisional licensed driver crashes when a passenger restriction is in place.<sup>18</sup> Furthermore, evaluations conducted in the USA have found positive effects relating to the implementation of passenger restrictions.<sup>4,30,37</sup> Additional research from the USA suggests that GDL laws that prohibit teenage

passengers are effective in reducing fatal crashes for 16- and 17-year-old drivers.<sup>57</sup> However, provisional drivers are less likely to comply with passenger restrictions than they are with a night-time driving restriction.<sup>37</sup> Fortunately, a UK-based study by Jones *et al.* calculated that, even with a 50% compliance rate, fatalities and serious injuries to novice drivers would be reduced if these restrictions were implemented.<sup>58</sup>

### ALCOHOL RESTRICTIONS

While young people drive under the influence of alcohol less frequently than adults, research indicates that they have an increased crash risk when they do engage in this behaviour.<sup>61,62</sup> While blood alcohol content (BAC) restrictions for all drivers are frequently present in licensing systems, stricter BAC restrictions (with permissible BAC set at a much lower level) are often part of a GDL system. All Australian states have BAC restrictions for provisional drivers, although this restriction may sometimes only apply to drivers below a certain age.<sup>63</sup> Additionally, New Zealand and jurisdictions within the USA and Canada also have BAC restrictions.<sup>63,64</sup>

### MOBILE PHONE RESTRICTIONS

Younger drivers are more likely than older drivers to use their mobile phone while driving.<sup>65,66</sup> A survey of American college students found that they were more likely to crash or nearly crash while talking on a mobile phone than when they were dialling or answering their phone.<sup>67</sup> Mobile phone bans while driving are designed to counter the problem of distraction for new drivers.<sup>37</sup> Research suggests that those who use mobile phones (including texting) while driving have an increased risk of crashing.<sup>68,69</sup> The incorporation of a mobile phone ban into GDL systems has also been prompted by research indicating that the use of hands-free mobile phone devices does not eliminate the crash risk.<sup>70</sup>

Restrictions on mobile phone use are present in several American and Australian jurisdictions. These restrictions either apply to all drivers or just newly licensed drivers.<sup>37,47</sup> Foss *et al.* examined mobile phone use among drivers and identified that the law had little effect on the use of these devices by young drivers.<sup>71</sup> The method of enforcing this restriction is likely to impact on its effectiveness.<sup>71,72</sup> Further research indicates that public education campaigns which are implemented in an evidence-based manner may be useful in reducing illegal mobile phone use.<sup>73,74</sup>

### VEHICLE POWER RESTRICTIONS

A vehicle power restriction is used to limit the type of car that a newly licensed driver may drive.<sup>75</sup> For

instance, they may be restricted to a certain number of cylinders or a power-to-weight ratio. The rationale for this restriction is that young individuals who drive an above average performance vehicle tend to have a more dangerous attitude towards driving than other young drivers, as was evidenced by Clarke *et al.* during an in-depth study on accident causation.<sup>76</sup> Vehicle power restrictions have existed for some time in Australia; however, the effectiveness of this restriction in reducing crashes is limited at best. A recent study suggests that, due to the low numbers of high-powered vehicles driven by provisional drivers, the reduction in injury rates from these restrictions ranges from 0.4% in New Zealand to 2.5% in the Australian states of Queensland and Victoria, provided there was 100% compliance with this restriction.<sup>75</sup>

### P-PLATES

P-plates, also known as decals, are signs prominently displayed on a vehicle to indicate to others that the driver of the vehicle holds a provisional licence and is not yet fully licensed.<sup>77</sup> Research shows that the mandatory display of P-plates may increase compliance with, and the enforcement of, other driving restrictions.<sup>4,78,79</sup> They also indicate to other drivers that the person holds a provisional licence and may encourage the other drivers to limit their own risk-taking behaviours.<sup>80</sup> Additionally, the removal of the requirement to display these plates may be seen as an incentive for provisional drivers.<sup>80</sup>

One study evaluated the decal law in New Jersey and found that it positively affected provisional drivers' safety and reduced their crash rates by 9%.<sup>77</sup> However, Williams *et al.* found that the requirement to display decals was not popular with young people in New Jersey.<sup>81</sup>

### EXIT TESTS

The purpose of an exit test is to assess a provisional driver before they obtain their full driving licence. It is designed to ensure that the provisional driver is capable of holding a full (unrestricted) licence and may highlight the fact that a provisional driver is still developing their driving skills and abilities.<sup>6,82</sup> Exit tests, like other tests within the licensing system, can use a range of formats, including knowledge tests, hazard perception tests or on-road driving tests.<sup>63</sup> One North American study found that exit tests were beneficial in reducing the relative fatality risk, although another review concluded that the effectiveness of driver testing, including exit tests, is not yet known.<sup>30,83</sup>

## Parental Involvement

A key factor within GDL systems is the level of support that parents provide, with research indicating that parental involvement has a positive impact on the safety of young drivers.<sup>4,8,84</sup> Parents involved in the learning process tend to be strong supporters of GDL,<sup>4,85-88</sup> however, while GDL systems that implicitly encourage parental involvement are now implemented in many jurisdictions, parents tend not to be systematically involved in the process.<sup>34</sup> A criticism of many studies on GDL was highlighted in a recent report—most studies look at novice drivers in isolation, rather than investigating the relationship between novice drivers, their peers and their parents in a holistic way.<sup>89</sup>

### PARENTAL INVOLVEMENT IN THE LEARNER PHASE

The involvement of parents in the learner phase is critical to the success of GDL systems.<sup>4</sup> Research has shown that the support of parents was necessary for the majority of learner drivers to accrue sufficient driving experience.<sup>41</sup> This may be due to the expense of being taught professionally; a recent study indicated that the cost of hiring professional driving instructors was prohibitively expensive for teenage drivers.<sup>90</sup> Several studies have shown that young drivers in GDL programmes benefit from increased parental driving instruction and supervised driving during the learner phase, with parents tending to spend more time supervising driving than was required by law.<sup>45,91</sup> Research suggests that, at least for the first four months of supervised driving, parents tend to focus on vehicle handling and operation.<sup>92</sup>

According to a study based in North Carolina, mothers assume most of the responsibility for supervising a teenage driver in possession of a learner's licence.<sup>52</sup> Mothers appear to be more safety conscious than fathers and consider driving at all of the licensing stages to be riskier.<sup>87,88,93</sup> Perhaps this explains why mothers were more likely to delay driving privileges than fathers in another study based in Connecticut, USA.<sup>87</sup> Further research indicates that parents continue to influence the newly licensed driver's behaviour once they progress to solo driving.<sup>2,89,94,95</sup>

### PARENTAL INVOLVEMENT IN THE PROVISIONAL PHASE

Parental involvement does not cease once the new driver obtains a provisional licence. Some authors argue that parental involvement is most important when young drivers are able to drive solo.<sup>51</sup> Parents can be involved by playing an active role in placing

restrictions upon new drivers and enforcing GDL requirements.<sup>91</sup> However, parents and their children may not agree on driving rules, with research demonstrating that parents tend to have a stricter interpretation of the rules than their children.<sup>96,97</sup> For these reasons, parents might not become actively involved in managing their children's driving.<sup>97</sup>

While nearly all parents place driving restrictions on their children, young drivers who have been licensed under a GDL system report more parental restrictions than those who have not.<sup>91,98</sup> Research indicates that most parents set limits on newly licensed drivers, although these limits tend not to be strict or maintained for too long.<sup>99</sup> The restrictions may also be focussed on issues that do not directly affect crash risk, such as obtaining permission to drive the family car in the first place.<sup>51</sup>

Young drivers with parents who impose stricter limits reported engaging in less risky driving behaviours and had fewer traffic violations and crashes.<sup>51,100,101</sup> While parental limit-setting does have some safety benefits, it appears that these benefits are modest, have a limited time span and are not well enforced.<sup>51</sup> Additionally, there are often no clear consequences for young drivers when parental driving-related rules have been violated.<sup>51</sup>

#### PROGRAMMES TARGETING PARENTS

In a study by Bates *et al.*, siblings, parents and other family members of learner drivers reported that parental involvement in supervising learners should be extensive.<sup>102</sup> Given this, the need to increase parental education regarding GDL is important. While many parent education programmes exist, the most common is the Checkpoints Program used in the USA, which is designed to encourage parents to limit driving under high-risk conditions when the driver is first licensed.<sup>4,103</sup> The Checkpoints Program uses videos, newsletters and a parent-teen driving agreement in order to encourage parents to monitor their child's driving. Evaluations of this programme have found it effective in influencing parental limit-setting and reducing risky driving behaviours and traffic offences among participants during their first 12 months of driving.<sup>51</sup>

In Connecticut, parents are now required to complete a training course when their child first begins learning to drive. An evaluation of the course suggested that parents approved of the requirement to attend the course and believed the training would help them in their role as supervisor of a learner driver.<sup>104</sup> Some parents stated that they were more likely to enforce the GDL rules as a result of this course.<sup>104</sup>

## Compliance and Enforcement

### COMPLIANCE

New drivers do not uniformly comply with all restrictions present in GDL systems, as the levels of compliance are higher for some restrictions when compared with others; for example, research indicates that new drivers are more likely to comply with a late night driving restriction than with a peer passenger restriction.<sup>105</sup> It also appears that novice drivers become less compliant with road laws as they progress through their provisional driving licence.<sup>106</sup>

In North Carolina, Foss *et al.* found that 17% of learner drivers had driven without a supervisor present in the vehicle.<sup>107</sup> In Nova Scotia, Canada, and California, USA, approximately 40% of intermediate licensed drivers reported that they had occasionally violated the night-time driving restriction.<sup>108,109</sup> However, only 12–15% of drivers on their intermediate licence reported doing so often.<sup>108,109</sup> Despite the fact that significant numbers of new drivers have, at some stage, not complied with a GDL restriction, research shows that the laws are still successful in reducing the crash risk for novice drivers.<sup>63</sup> Nevertheless, it is likely that the effectiveness of GDL systems would be enhanced by improving learner drivers' compliance with the restrictions. Accordingly, it is important to examine the factors that influence compliance rates.

Compliance with the GDL system is, to some extent, self-motivated. Individuals are expected to conform to the laws as they represent the expected standard of behaviour. However, this will not work if the GDL laws require new drivers to comply with standards that are not considered 'reasonable' by the majority of new drivers. Compliance with the GDL system could therefore be enhanced by ensuring that most new drivers consider the provisions contained within the GDL system to be reasonable.<sup>110</sup>

Parents also appear to impact the likelihood of their children complying with traffic laws. A study by Desrichard *et al.* found that novice drivers whose parents provided a strong supervisory role displayed a more negative attitude towards violating road rules and had less intention of violating these laws.<sup>111</sup>

### THE ENFORCEMENT OF ROAD LAWS

Generally speaking, the enforcement of traffic laws is the most common initiative used to modify driver behaviour and thus reduce the incidence of traffic accidents.<sup>112</sup> However, the provisions within a GDL system are difficult for police officers to enforce, particularly if they are unable to recognise which driving restrictions apply to which licence.<sup>89,105</sup> If police

officers do not have a full understanding of the GDL laws, they may be placed in difficult situations when they attempt to enforce laws amongst new drivers who have greater knowledge of the law.<sup>113</sup>

One study examined whether publicity and increased enforcement also increased compliance with GDL restrictions.<sup>113</sup> The programme used mechanisms known to change driver behaviour in other contexts. It resulted in a modest increase in infringement notices issued to novice drivers, although virtually no tickets had been issued previously.<sup>113</sup>

GDL relies on parents to enforce its various provisions.<sup>1,87,104,110</sup> Given the difficulties involved with police enforcement, parents are implicitly expected to implement driving restrictions and monitor compliance with these restrictions; this was demonstrated during a telephone survey of parents of teenagers as well as other adults.<sup>114</sup> Research has shown that parents have a significant influence on the driving compliance of provisionally licensed drivers and that they are much more influential than the police.<sup>89</sup> GDL programmes provide parents with support in setting limits for their children. In addition, GDL systems clearly identify the factors that are high-risk and establish readily apparent limits for parents on what is appropriate driving behaviour.<sup>98</sup> The effective enforcement of GDL provisions requires parents to be aware of the GDL system requirements in their jurisdiction.<sup>104</sup>

## Conclusion

GDL systems aim to gradually increase the exposure of new drivers to more complex driving situations in as safe a manner as possible. These systems typically consist of learner, provisional and open licence phases. The first phase of a GDL system, the learner licence, is designed to allow new drivers to obtain practical driving experience in a lower risk situation. Benefits from this phase may result from the delayed licensure, supervised learning process, mandated hours of practice and the involvement of parents. The second phase of the GDL system, the provisional licence, reduces new drivers' exposure to risky situations including driving at night, with passengers or after drinking alcohol. These risks are managed by putting various driving restrictions in place. The involvement of parents with GDL appears essential. They tend to be heavily involved in helping teenage drivers obtain sufficient practice and in enforcing compliance with restrictions once the new driver obtains a provisional licence. Given the significant number of young drivers involved in crashes within Oman, GDL is one

countermeasure that may be beneficial in reducing crash risk and involvement for this group. Oman has an opportunity to apply the international research reviewed above and introduce various aspects of GDL that have demonstrated crash reductions in other jurisdictions.

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