



Graduated driver licensing: the New Zealand experience

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Abstract

In New Zealand, on 1 August 1987, a three-stage graduated driver licensing (GDL) system that applied to all new drivers aged 15–24 years was introduced. The essential elements of GDL were a 6-month learner license (supervised driving) and an 18-month restricted license stage (with restrictions on night driving and carrying passengers). A blood alcohol limit of 0.03 mg% applied at both stages.

Evaluation studies: Early studies indicated that young people were reasonably accepting of the restrictions, with the passenger restriction being the least acceptable. Problems of compliance with the restricted license driving restrictions were reported. Evaluations of the impact of the graduated driver licensing (GDL) on serious traffic-related injury showed that up until 1991–1992, an 8% reduction could be attributed to GDL. At this time, it was considered that reduced exposure was the main reason for this reduction. However, the number of fatalities and hospital admissions among young people continued to decline, as did the population rate and the rate per number of licensed drivers among the young driver age group. A further evaluation study showed that drivers with a restricted license had a smaller proportion of crashes at night, and with passengers, compared with drivers licensed before GDL.

Impact of GDL: These results suggested that GDL restrictions had contributed to the reduction in crashes among young people and that it was not simply a case of reduced exposure to risk. An update of the most recent crash statistics indicated that, compared with older age groups, the fatal and serious injury crash rate among young people has remained substantially below the pre-GDL level. This suggests that the impact of GDL has not diminished over time.

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1. Situation before the introduction of GDL

In 1985, for young New Zealanders aged 15–24 years, the traffic crash fatality rate was nearly 48 per 100,000 population. This compared with 35 in the United States, 34 in Canada, 40 in Australia, and 18 in the United Kingdom and Sweden (International Road Traffic and Accident Database). In 1986, 39% of all motor vehicle traffic fatalities in New Zealand involved those within 15–24 years old, yet they represented only 18% of the total population. Young drivers aged 15–19 years drove only 8% of the annual mileage but comprised 27% of all drivers in motor vehicle traffic injury crashes (Ministry of Transport, 1985). In response to this overrepresentation of young people in traffic crashes, the New Zealand Parliamentary Select Committee on Road Safety proposed a Graduated Driver Licensing system.

2. Driver licensing in New Zealand before GDL

Before GDL was introduced in 1987, a 15-year-old could apply for and obtain a full-privilege driver's license on their 15th birthday. To do this, they were required to pass a standard driving test, comprising of an eyesight and hearing test, 25 written questions, five oral questions, and a practical driving test. Prior to this, other licensing schemes had been tried. In 1966, a probationary license system was instituted, and persons gaining a new license were probationers for a period of 2 years. The conditions of the probationary system were the following: probationers must display an "L" sticker, their maximum speed is 50 mph, they could not teach another person to drive, and could not drive an ambulance, school bus, or vehicle carrying passengers for hire or reward. After 4 years, an evaluation of this scheme showed that it had little or no effect on the crash rate; thus, it was revoked in 1971. The next licensing system to be recommended was a provisional licensing system. The provisional license scheme would require a pass in tests

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covering “knowledge of the law and principles of sound driving” before practical instruction could be taken on the road. This recommendation was not acted upon.

In 1984, the Ministry of Transport invited Dr. Pat Waller to New Zealand to advise on how New Zealand may address the young driver problem. In 1985, the Ministry of Transport proposed that a new licensing system be introduced and an inquiry was held by the Parliamentary Road Safety committee to examine this proposal. The principles on which they considered a desirable licensing system should be based were (a) to improve the driver preparation of young and inexperienced drivers, (b) to encourage formal training (but it should not be required until research demonstrated that it was cost beneficial and practicable), (c) to encourage learners to acquire safer driving skills and attitudes, (d) to reward safe driving, (e) it should not be more attractive to get a motorcycle license before or instead of a car license, (f) the system should be simple and easily enforceable, and (g) a continuing need for evaluation of any new system was acknowledged. Included in the package of measures designed to address these principles were ways of providing better driver training for driving instructors, ways of encouraging learner drivers to have formal driver training, improving the standard of the licensing tests, and developing a GDL system. These strategies were viewed as “more constructive alternatives to the frequently advocated raising of the minimum driving age, because they tackle the combination of lack of experience and youth, rather than focusing on the latter” and although a GDL system was seen as “the most controversial” strategy proposed, it was also considered the one most likely to contribute to improved road safety (Ministry of Transport, 1985).

3. The GDL system introduced in 1987

Following these recommendations, in August 1987, a GDL system was introduced in New Zealand. This was a three-stage licensing process that applied to all new drivers between 15 and 24 years. The first stage, a learner license, could be obtained at age 15 by passing a written test, an oral theory test, and an eyesight test. With a learner license, the young driver was required to always be accompanied by a supervisor (i.e., someone at least 20 years of age, who had held a full car license for at least 2 years, and is currently fully licensed) who was in charge of the vehicle. They were required to have their license with them when driving and a blood alcohol limit of 0.03 mg% was introduced (this compared with 0.08 mg% for other drivers) also. The duration for a learner license was 6 months; however, a time discount could apply, reducing the 6 months to 3 months, by taking an approved driving course. The second stage of GDL was a restricted license stage and obtaining this license required passing a practical driving test. The restricted license included three main driving restrictions:

(a) a nighttime driving curfew from 10 p.m. to 5 a.m. (unless accompanied by a supervisor), (b) no carrying of passengers less than 20 years of age (unless accompanied by a supervisor), and (c) a blood alcohol limit of 0.03 mg%. The restricted license applied for 18 months, but a time discount of 9 months applied if a Defensive Driving Course or an Advanced Driving Course was completed. After completing the restricted license stage, a full license could be applied for and obtained without further testing. Under GDL, therefore, a driver could commence driving at 15 years of age and be fully licensed shortly after their 16th birthday, if they passed the required courses. Violations of the conditions of GDL could be penalized by extensions of up to 6 months to the license currently held by the young driver. Violations of other traffic laws or regulations were processed in the usual way.

4. Evaluations of the 1987 New Zealand GDL

The 1987 GDL system remained unchanged until May 1999 when after an extensive review some changes were made. These changes will be discussed later. The following evaluation studies were based on the 1987 GDL system.

Since GDL was introduced, several studies have evaluated aspects of this licensing system (Begg, Langley, Reeder, & Chalmers, 1995; Begg, Stephenson, Alsop, & Langley, 2001; Frith & Perkins, 1992; Langley, Wagenaar, & Begg, 1996; Whines, 1988). The first of these studies was undertaken around the time GDL was introduced and examined the attitudes of young drivers licensed pre-GDL with those licensed with a GDL (Whines, 1988). The results showed that the GDL group tended to favor younger minimum licensing ages than the pre-GDL group, but there was little difference between the groups as far as attitudes to the driving restrictions were concerned, with 26% supporting all three restricted license conditions (i.e., passenger, night curfew, and alcohol). For both groups, the restriction on carrying young passengers was the least acceptable and the main reason given for this was the inconvenience of not being able to transport family and friends. However, around 30% considered that this restriction was convenient in that it meant that they could not be expected to provide rides for other young people, and it reduced their responsibility in this respect. Very few of the GDL group reported driving unsupervised, and 78% reported that they would not breach the conditions of their license. The perception of being caught by the police if they did breach the conditions was very low (14%).

The second study evaluating attitudes toward GDL focused on a cohort of young people who had been involved since birth in a longitudinal study of health and development (Begg et al., 1995). Coincidentally, the members of this cohort were among the first young New Zealanders to become licensed under the GDL system.

The attitudes of this cohort toward GDL were examined when they were 15 years of age, before they had commenced licensure, and again at 18 years, after they had actual experience with the licensing system. The results at age 15 showed that the majority did not expect to be affected by the restrictions: learner license 63%, nighttime curfew 82%, passenger restriction 67%, alcohol restriction 94%. For those who thought the restrictions would affect them a lot, the main reasons given were inconvenience to family and other persons over 20 years of age, restriction on social activities, and a general limitation on mobility. Overall, 79% agreed or strongly agreed with GDL, although knowledge about the system did not appear to be very high. At age 15, the study members were asked how they could reduce the time required for the learner license, 42% of the males and 28% of the females answered correctly. When asked the same question about the restricted license, 39% of the males and 20% of the females answered correctly.

At 18 years of age, 876 cohort members were interviewed and it was determined that 271 (31%) had a full graduated license, 197 (22%) a restricted license, 99 (11%) a learner license. The majority reported that, in general, the driving restrictions had affected them either a little, or not at all, although this proportion varied considerably depending on the restriction. Also, there were significant differences between males and females. For the learner license, more males than females reported that they had been affected a lot (30% vs. 21%, $p < .004$), whereas, for the nighttime curfew and passenger restriction, more females than males reported being affected a lot (nighttime curfew 40% vs. 28%, $p = .005$; passenger restriction 49% vs. 38%, $p = .02$). The alcohol restriction did not affect 92% of both males and females. For those who were affected a lot by the restrictions, the main reasons given were the same as at age 15. Overall, the majority of the young drivers agreed with the GDL restrictions and although this proportion decreased significantly after experience, by 18 years of age over 70% still agreed with them.

By age 18, however, there was evidence of problems with compliance with the restrictions with 68% of these young drivers having broken at least one of the conditions of their license. For those with a learner license, this figure was 38%, whereas for those with a restricted license, 92% had broken the passenger restriction, 66% the nighttime curfew, and 16% the alcohol restriction. The comparable figures for the full graduated license group were 92%, 51%, and 5%, respectively. Of those who broke a condition of GDL, 18% were apprehended by the police, and of these, half had the period of the relevant license extended.

The first study to examine the impact of GDL on traffic crashes involving young people was by Frith and Perkins (1992) of the Land Transport Safety Authority (LTSA). This study focused on the 15- to 19-year age group as they were the “major target group for the legislation” and

compared the crash rates of drivers in this age group with those aged 25 years and older. The results showed that immediately following the introduction of GDL, there was a marked decrease in the rate (per 10,000 population) of 15- to 19-year-old drivers in crashes reported to the police, in admissions to hospital for crash-related injury, and the ratio of crashes involving the 15- to 19-year-old drivers compared with drivers 25 years old and older. While the effect partially dissipated after 2 years, by 1992, there was a continuing 8% reduction in the proportion of crash involved drivers aged 15–19 years, which was considered very worthwhile.

There was some concern that the introduction of GDL may have resulted in increased unlicensed driving. To determine if this may have been the case, Frith and Perkins (1992) examined the license status of drivers involved in crashes and found that the proportion of unlicensed drivers was virtually unchanged, indicating no apparent increase in unlicensed driving associated with GDL. Immediately following the introduction of GDL, however, there was a sharp decrease in the number of applicants for the practical driving test, resulting in a decline in the number of licenses held by young drivers. Given that unlicensed driving did not appear to have increased it was thought that there must have been less driving by young drivers, which was possibly the most important reason for the reduction in crashes among this group.

Frith and Perkins (1992) also reported frequent breaches of GDL conditions by some young drivers. In a survey of 392 young drivers, 60% reported they were affected by the passenger restriction and 33% reported breaking it on at least a weekly basis. Nearly half were affected by the nighttime curfew and 17% broke it on at least a weekly basis.

Langley et al. (1996) published an evaluation of GDL that used time-series analyses to examine monthly counts of traffic-related hospital admissions for the period 1978–1992. For this study, the 15- to 19-year age group were the main GDL target group, and they were compared with two road traffic comparison groups. The first was the 20- to 24-year age group, who were considered a “diluted treatment group” because although GDL applied to 15- to 24-year-olds, most drivers obtain their license before 20 years of age, and an “untreated” group for those 25 years old and above. To determine whether the trend in traffic injuries for the 15- to 19-year age group was simply following trends for other injury events in this age group, two nontraffic injury comparison groups were included. One was an example of intentional injury (i.e., assault) and one unintentional injury (mainly sports injury). The results showed that after GDL took effect, there was a 23% reduction in hospitalized injuries among the 15- to 19-year age group, 12% for the 20- to 24-year-olds, and 16% for those 25 and older. The analyses of hospital admissions for the other injury groups showed no consistent trend, with sports injuries decreasing 12% and assaults increasing 10%. Eco-

conomic factors could have influenced the reduction in crashes involving young people but unemployment figures indicated that the 15- to 19-year age group were not unduly affected by the economic downturn that coincided with the introduction of GDL. Therefore, assuming the 16% decline in 25+ age group was not due to GDL, then the excess decline of 7% for the 15–19 age group (23% for the 15- to 19-year-olds minus 16% for the 25+ age group) could be attributed to the GDL.

From the results of these evaluations, it seemed that a major impact of GDL was a sharp reduction in the amount of driving by young people, thus reducing their exposure to crash risk. The evidence for this was the sudden decrease in the number of 15- to 19-year-olds with driver licenses following the introduction of GDL. However, although there was an initial decline in driver license numbers among young people, within a few years this had recovered to a level similar to before GDL. At the same time, the number of crashes involving young drivers continued to decrease resulting in a decrease in the fatality and hospital admission rate per number of licensed drivers. GDL, therefore, was associated with an ongoing decrease in the number of crash-related injuries to young people, but more importantly a decrease in the rate per number of licensed drivers. At this stage, however, it was still not possible to determine whether the actual restrictions of GDL were having an impact on the crash risk or whether this was due to other factors. A further evaluation of GDL was undertaken to try and determine the impact of the driving restrictions on crashes among young drivers.

For this study (Begg et al., 2001), a database was created linking the police traffic crash reports (which contained the crash details) to the New Zealand Health Information Service (NZHIS) hospital inpatient file. Linking these data sets was considered necessary to ensure that the crash records to be examined were not biased in any way with respect to the factors under investigation. The criteria for case selection were a linked record (i.e., a police traffic crash record matched to a hospital record), a motor vehicle occupant (excluding motorcyclists), crash occurred between 1980 and 1995, inclusive, involved a driver aged 15–19 years of age, and the license status of the driver was known. There were 4,904 cases included in the analyses, 76% were male. For the analyses, the crashes involving a driver licensed pre-GDL were compared with (a) crashes involving a driver with a restricted license and (b) crashes involving a driver with a full GDL.

Separate regression models were fitted for each of the restrictions. Gender, age, and year of the crash were controlled for in the analyses. The results showed that, compared with the pre-GDL drivers, a significantly smaller proportion of the crashes involving a restricted license driver (a) occurred at night (odds ratio .66, $p=.003$), (b) involved passengers of all ages (odds ratio .73, $p=.018$), and (c) alcohol was suspected (odds ratio .72, $p=.034$). For the

results comparing the pre-GDL driver crashes with the full GDL licensed drivers, the only significant difference was fewer nighttime crashes among the full GDL drivers (odds ratio .77, $p=.04$).

The results from this study indicated that the GDL restrictions, and in particular the nighttime driving curfew, had made a positive contribution to the reduction in young driver crashes. Although the results for the passenger restriction were encouraging, a full evaluation of this restriction was not possible because data on the age of the passengers was only available for those who had been injured. For the alcohol restriction, a number of factors other than GDL system may have contributed to this result. In 1992, the legislation was changed to extend the lower 0.03 mg% limit to all drivers under 20 years of age, irrespective of the type of license. This change would have had direct impact on the last few years of the results in this study. In addition, a range of other strategies has been implemented to target drinking and driving in the whole driving population. These include compulsory breath testing, booze buses, drink–drive blitzes, and media campaigns. These strategies should have had some effect on the behavior of young drivers, making it impossible to disentangle the impact of the graduated licensing alcohol restriction.

5. Review of GDL in 1999

In December 1994, the LTSA initiated a major review of all driver licensing policies in New Zealand, including a review of the GDL system. This review followed the LTSA's rule-making process that has four phases: (1) policy development and release of discussion documents, (2) input from technical experts, (3) input from the public, and (4) government phase when the rule becomes law. The driver licensing review process started in December 1994 and 4 1/2 years later (May 1999), the following changes to GDL were passed into law. The GDL applied to all novice drivers, not just 15- to 24-year-olds. The learner license must be held for 6 months (the earlier time discount no longer applied) and "L" plates must be displayed during the learner license stage (but not at the restricted stage). For drivers aged 15–24 years, the restricted license period is 18 months, and for those over 24 years, it is 6 months. A time discount can apply at the restricted license stage. For drivers aged 15–24 years, the 18 months can be reduced to 12 months by completing a driving course approved by the director of LTSA and if they began the course no less than 6 months after receiving their restricted license. For drivers over 24 years, the 6 months can be reduced to 3 months by completing an approved driving course. Licenses obtained driving a car with automatic transmission would result in an "automatic only" license condition on a restricted license. The supervisor at the learner and restricted license stages must be someone who

has been fully licensed for at least 2 years and currently holds a full license, but the 20-year-old minimum age was discontinued. A new driving test based on driving skills, and hazard recognition was introduced so that obtaining a full license now required passing a driving test and not simply waiting out the required time on a restricted license. A new penalty regime was introduced for breaches of the conditions of GDL. This comprised a \$400 (NZD) fine and 25 demerit points for any breach of a license condition. If 100 demerit points are accumulated within a 2-year period, the license is suspended for 3 months.

Two changes that were proposed and arguably had the most potential to improve the safety of novice drivers were an increase in the minimum driver licensing age from 15 to 16 years and a zero blood alcohol limit. Despite apparent widespread public support, these two measures did not receive the necessary parliamentary support and were, therefore, not enacted.

6. Update of traffic crash statistics

To provide an update of the impact of GDL on serious traffic crash-related injuries in New Zealand, the motor vehicle occupant fatality and hospitalization rates per 100,000 population for the years 1980–1998 are presented in Fig. 1.

Using similar categories to Langley et al. (1996), the 15- to 19-year age group represent the main target or “treatment” group, the 20- to 24-year age group the “diluted

treatment” group, and the 25–40 and 41+ age groups the “untreated” groups. The results show that relative to the untreated groups, the rates for the treatment groups (15–19 and 20–24 year age groups) have declined substantially since GDL was introduced, with the most dramatic decline occurring immediately following the introduction of GDL in 1987.

The above results, however, could have been due to fewer drivers or less driving among the 15- to 19- and 20- to 24-year age groups, and therefore the main impact of GDL may have been reduced exposure rather than safer driving under GDL. To determine if reduced driving was the reason, it would be necessary to examine either the number of crashes per distance traveled (for which there was no available data) or use a proxy measure for exposure such as the number of licensed drivers. However, due to the structure of the New Zealand driver license database, limited information was available on the number of licensed drivers in New Zealand before and after the introduction of GDL. Hence, to examine the effect of GDL on driver fatal and serious injury rates per number of licensed drivers, the number of license holders had to be estimated for the years for which the data were not available. The results of these analyses are presented in Fig. 2 and show that compared with the 25–40 age group, there was a reasonable decline in the rate for 15- to 19-year-old drivers, and a slight decline for the 20- to 24-year-old drivers.

These results suggest that the decrease observed in Fig. 1 was not due solely to fewer young drivers, but that

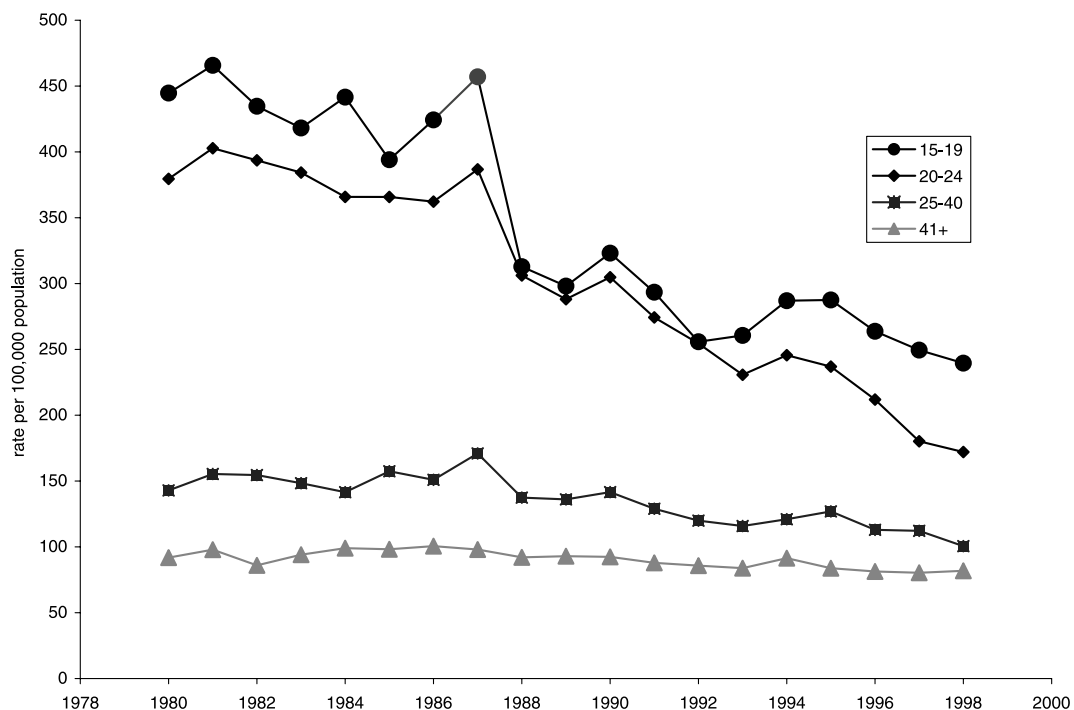


Fig. 1. Motor vehicle traffic crash fatality and hospitalization rates (per 100,000 population), 1980–1998.

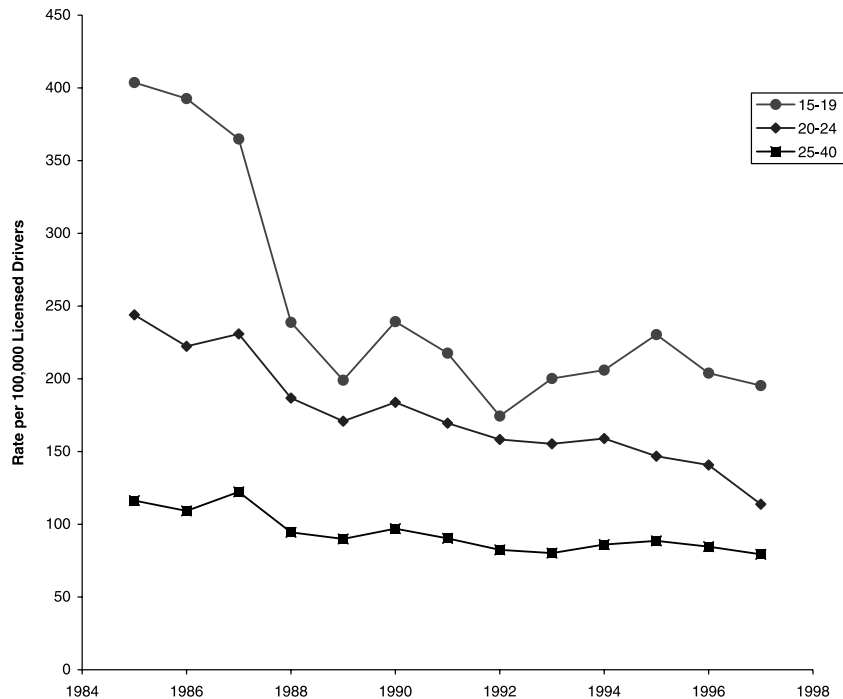


Fig. 2. Rate of driver fatalities and hospitalizations per 100,000 licensed drivers, 1984–1998.

with GDL, there was likely to have been a change in overall driving exposure and also the nature of this exposure thus resulting in the observed reduction in traffic-related injury.

7. Impact on research, practice, and policy

In the 12 years from 1987 to 1998 (inclusive), the number and rate (per 100,000 population) of fatally or seriously injured motor vehicle occupants aged 15–24 years of age has nearly halved. While factors other than GDL will have contributed to this result, there is little doubt that GDL has been the most important factor influencing this outcome. Determining the extent to which the various components of GDL contributed to this reduction has been hindered by the lack of relevant data to allow a detailed examination of these factors. There is good evidence that the nighttime curfew has had a positive impact on reducing nighttime crashes. There is also encouraging evidence that fewer young people are being injured as passengers in vehicles driven by young drivers. Although the results from surveys of driving behavior have consistently shown a willingness among young drivers to breach the conditions of GDL, the quantity of driving being done by young drivers under these conditions of high risk has almost certainly reduced since GDL was introduced. A higher level of compliance with the restrictions would help produce further safety gains, and it will be of interest to see if the 1999 penalty regime for breaches of the license conditions has been effective in bringing about these desired changes.

8. Future young driver research in New Zealand

The traffic-related injury problem among young people in New Zealand has come a long way since 1987 and GDL appears to have made a substantial contribution to this result. There is undoubtedly potential to improve the performance of GDL but at present, there is a lack of New Zealand-based scientific evidence to determine the changes that need to be made to achieve this. The data that are routinely collected by the police for the national traffic crash database do not include the range of factors or the level of detail that is required for an in-depth evaluation of the many aspects of GDL. The most practicable way to obtain all of the relevant information is a prospective cohort study of novice drivers. Such a study is planned for New Zealand, and the piloting for this is underway at present.

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