`

University of Southern Queensland
Faculty of Engineering and Surveying

A Preliminary Analysis of the Effectiveness of the New QLD GDL Program

A dissertation submitted by

Neil William Randall

In fulfilment of the requirements of

Courses ENG4111 and 4112 Research Project

Towards the degree of

Bachelor of Civil Engineering

Submitted: October 2011

Prepared by	Neil Randall
University Supervisor	Soma Kathirgamalingam
Status	Final

Abstract

Globally traffic accidents are the leading cause of death for young people aged 15 to 19 years. More than 40% of all road traffic deaths occur among people aged 0 – 25 years, (WHO, 2007; WHO, 2006).

Australia is not immune to this epidemic. In 2007 nearly a quarter of all individuals killed in Australian road accidents where aged between 17 and 25 years, (Albanese A, 2008).

The current literature identifies many reasons for why young drivers are so overrepresented in accident statistics. These reasons are termed 'risk factors' with the majority of research identifying the following risk factors:

- Inexperience.
- Less developed visual perception and cognitive skills.
- Deliberate risk taking.
- Inability to identify risks or hazards.
- Overconfidence.
- Inattention / Distraction.
- Tendency to drive at high risk times.
- Alcohol or Drugs.
- Choice of vehicle.

Many programs have been implemented to address these risk factors, resulting in varying levels of success. However one particular strategy, aimed specifically at young novice drivers, has produced significant results internationally. This strategy is graduated drivers licensing.

Graduated Drivers Licence (GDL) programs differ from jurisdiction to jurisdiction however they all adhere to a fundamental philosophy of providing a step wise approach to full licensing.

In their most basic form GDL programs generally involve a three stage licensing system consisting of an extended learner's period, an intermediate licence stage and a full licence. GDL licence holders are required to not only adhere to all standard traffic and licensing regulations but also have special restrictions and criteria that specifically apply to the stage of licensing the novice driver has achieved.

In July 2007 the Queensland Government implemented a new GDL program aimed at reducing the overrepresentation of young drivers in road accident statistics for the State of Queensland.

The preliminary data available at the time of writing this paper indicates the new GDL program has had some success in reducing hospitalisation crashes for young novice drivers however there is little evidence to suggest the new GDL program has been solely responsible for any reduction in fatal crashes for young novice drivers.

Additionally the available data indicates the new GDL program has had little to no impact on addressing crashes attributed to alcohol and therefore it is recommended that further investigation be conducted in to the potential benefits of implementing harsher punitive measures and return to driving restrictions along with the possibility of raising the legal drinking age.

Disclaimer

University of Southern Queensland

Faculty of Engineering and Surveying

ENG 4111 & ENG 4112 Research Project

Limitations of Use

The Council of the University of Southern Queensland, its Faculty of Engineering and Surveying, and the staff of the University of Southern Queensland, do not accept any responsibility for the truth, accuracy or completeness of material contained within or associated with this dissertation.

Persons using all or any part of this material do so at their own risk, and not at the risk of the Council of the University of Southern Queensland, its Faculty of Engineering and Surveying or the staff of the University of Southern Queensland.

This dissertation reports an educational exercise and has no purpose or validity beyond this exercise. The sole purpose of the course pair entitled 'Research Project' is to contribute to the overall education within the student's chosen degree program. This document, the associated hardware, software, drawings, and other material set out in the associated appendices should not be used for any purpose: if they are so used, it is entirely at the risk of the user.

Prof Frank Bullen

Dean

Faculty of Engineering and Surveying

Candidates Certification

I certify that the ideas, designs and experimental work, results, analysis and conclusions set out in this dissertation are entirely my own efforts, except where otherwise indicated and acknowledged.

I further certify that the work is original and has not been previously submitted for assessment in any other course or institution, except where specifically stated.

Name: Neil Randall

Student Number: 0050075615

_____

Signature

_____

Date

Acknowledgements

This research was carried out under the principal supervision of Soma Kathirgamalingam.

The author also wishes to thank staff from the Maroochydore Office of the Queensland Department of Transport and Main Roads for their support and access to the 'Road Crash 2' data used within this analysis.

Additionally the author would like to thank his wife and children for the support and encouragement that they have provided over the last 6 years of part time study.

Contents

List of Figures

List of Graphs

List of Tables

Nomenclature and Acronyms (or Abbreviations)

The following Abbreviations have been used throughout the text and Bibliography:-

GDL Graduated Drivers Licence

WHO World Health Organisation

1 Chapter 1: Introduction

1.1 Outline of the study

In July 2007 the Queensland Government introduced a new Graduated Drivers Licence (GDL) program. The program increased the time frames and requirements for learner drivers and imposed new requirements and restrictions for provisional drivers.

The purpose of these new licensing components was to improve young driver safety, skill and road awareness, with the aim of reducing the number of crashes involving young novice drivers.

1.2 Introduction

Of all the systems that people interact with on a daily basis, road transport is arguably one of the most complex and dangerous. Globally, deaths resulting from traffic crashes each year have been estimated at 1.2 million, while injuries have been estimated as high as 50 million (WHO, 2004). By 2020, it is estimated that road traffic injuries will account for 2.3 million deaths globally (Norton et al 2001).

Along with the personal distress to families of road traffic victims there is also an economic cost. The World Health Organisation (WHO) (2004) estimate the economic cost for low income countries to be 1% of gross national product (GNP), 1.5% of middle income countries and 2% in higher income countries. The direct economic cost of road crashes globally has been estimated at US$518 billion annually (WHO, 2004).

These figures are staggering but amazingly the epidemic that is traffic injury does not seem to receive the same media attention as other catastrophes around the world and hence the significance of programs designed to curtail the traffic crash epidemic are often overlooked. Those programs that are implemented are often highly politicised, with everyone having an opinion of how 'the problem' can be quickly fixed (WHO, 2004). Evidence indicates though, that effective programs are those based on data and objective information, not anecdotal evidence. Unfortunately there is no quick fix.

Traffic crashes result from a plethora of issues ranging from poor road design, poor vehicle design, human error, speed, alcohol, fatigue, inattention, etc. All ages are impacted upon by the epidemic of road crashes however the WHO has identified one high risk group in particular. That group is young road users.

For young people aged 15 to 19 years traffic injuries are the leading cause of death globally, in fact just over 1000 young people under 25 years of age are killed every day in road traffic crashes around the world (WHO, 2007). Globally more than 40% of all road traffic deaths occur among people aged 0 – 25 years (WHO, 2006). **Table 1** identifies the rank and cause of death globally for people under 25 years of age.

Table 1. 1: Rank cause or death among young people under 25 around the world, 2002

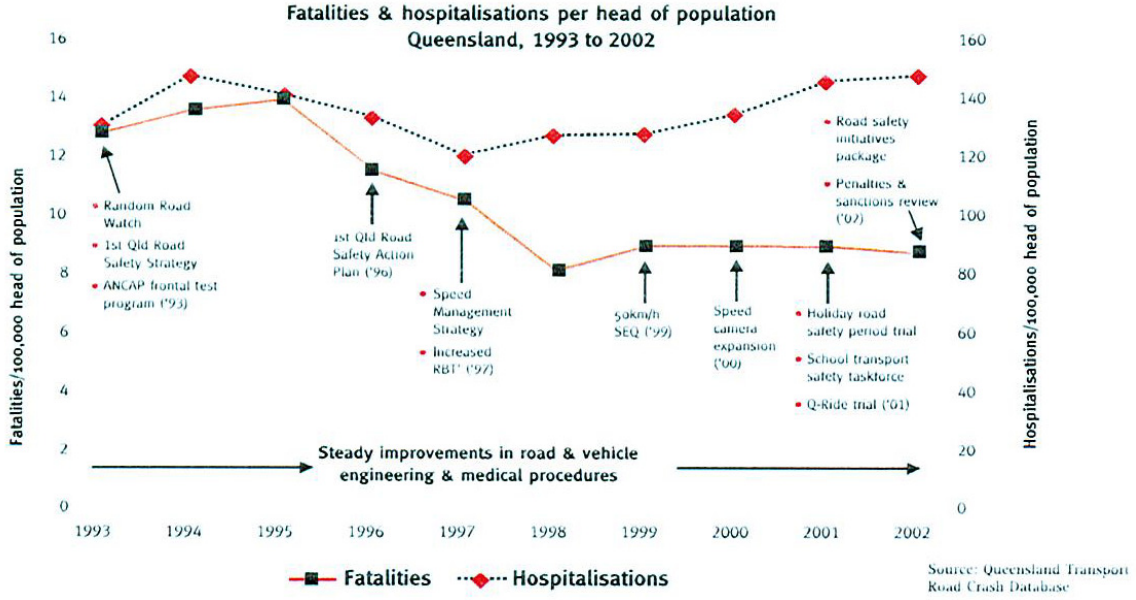
Rank	< 1 year	1 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	All < 25 years
1	Perinatal conditions	Lower respiratory infections	Lower respiratory infections	Lower respiratory infections	Road traffic injuries	HIV/AIDS	Perinatal conditions
2	Diarrhoeal diseases	Childhood cluster diseases	HIV/AIDS	Road traffic injuries	Self-inflicted injuries	Road traffic injuries	Lower respiratory infections
3	Lower respiratory infections	Diarrhoeal diseases	Road traffic injuries	Drowning	Maternal conditions	Self-inflicted injuries	Diarrhoeal diseases
4	Malaria	Malaria	Childhood cluster diseases	HIV/AIDS	Lower respiratory infections	Maternal conditions	Childhood cluster diseases
5	Childhood cluster diseases	HIV/AIDS	Drowning	Tuberculosis	Interpersonal violence	Interpersonal violence	Malaria
6	Congenital anomalies	Perinatal conditions	Meningitis	Protein-energy malnutrition	Drowning	Tuberculosis	HIV/AIDS
7	HIV/AIDS	Protein-energy malnutrition	Fire burns	Fire burns	Tuberculosis	Lower respiratory infections	Congenital anomalies
8	Protein-energy malnutrition	Congenital anomalies	Tuberculosis	Self-inflicted injuries	Fire burns	Fire burns	Road traffic injuries
9	Syphilis	Drowning	Protein-energy malnutrition	Leukaemia	HIV/AIDS	War	Drowning
10	Meningitis	Road traffic injuries	Falls	Interpersonal violence	Leukaemia	Drowning	Tuberculosis

Source: Who 2007 Youth and Road Safety page 10

This is not just a developing world problem. Chisholm and Naci (2008) identified that the age distribution for fatalities and non-fatal injuries from road crashes does not greatly differ among countries. In the European Union one in every three people killed on the road is younger than 25 years with the risk of being involved in a light or serious crash being five times higher for learner drivers than for experienced drivers (WHO, 2000).

Australia is not immune to this epidemic. The Australian road toll for 2007 was 1616 people, costing the Australian economy approximately $18 billion dollars (Albanese A, 2008). The Queensland Department of Transport (2003) estimated the cost of road accidents for Queensland in 2003 was in excess of $1 billion. The Department of Transport (2003) further state that while fatalities have reduced over the last decade, hospitalisation rates resulting from road accidents have increased. This includes such debilitating injuries as amputations, brain injury, quadriplegia and paraplegia, injuries that not only present a severe impact on one's life but also involve significant ongoing costs for society. **Graph 1** indicates the trend developing in hospitalisation rates compared to fatalities for Queensland.

Graph 1: Road safety initiatives and their effect on fatalities and hospitalisations



Source: Department of Transport 2003, *'Queensland Road Safety Strategy 2004-2011: Safe4life*, page 2

Like the rest of the world young drivers represent a high proportion of these deaths and injuries. In 2007 nearly a quarter of all individuals killed in Australian road crashes were aged between 17 and 25, (Albanese A, 2008).

In Queensland, road users aged between 17 and 24 years accounted for 28% of the 2004 road toll however 17 to 24 year olds represented only 12% of Queensland's 2004 population, (Department of Transport and Main Roads, 2009a). These figures indicate that in 2004 the road fatality rate for 17 to 24 year olds was three times the fatality rate for the entire Queensland population.

This trend is also evident in other Australian states. The Transport Accident Commission of Victoria cited in Vassallo et al (2007) reported that over a quarter (28%) of those killed in traffic crashes in the state of Victoria in 2002 were aged between 18 and 25 years, despite the fact that drivers in this range accounted for only 14% of all licensed drivers. Tay (2005) expands on this stating that of all road fatalities recorded in Victoria in 2002, 22.6% were males aged between 16 and 25.

The question is then, why are young drivers so at risk of road traffic injury and death?

1.3 The Problem

Despite the efforts of many well intentioned advertising campaigns, educational programs and governments, young drivers continue to be over represented in traffic crashes.

In July 2007 the Queensland government implemented several changes to its GDL program with the aim of addressing young driver crash rates. This study aims to determine the preliminary success and/or failings of these changes to the GDL program at addressing fatality and hospitalisation rates for young drivers.

1.4 Research Objectives

This study aims to address the following objectives:

- Identify the risk factors that cause young drivers to be so overrepresented in accident statistics.
- Determine the GDL programs impact on addressing fatal and hospitalisation crashes attributed to each identified risk factor.
- Determine the overall impact that the new GDL program has had on addressing fatal and hospitalisation traffic crashes for young drivers in Queensland.
- Identify if there are any risk factors where the new GDL program has had no effect, thereby exposing potential weaknesses of the GDL program.

To achieve the above objectives this study contains a literature review identifying the risk factors that have been attributed to be the cause for the overrepresentation of young novice drivers in traffic crashes.

A '*before and after study with comparison group'* of young novice drivers aged 17-20 years has then been conducted to determine the impact the new GDL program has had on addressing the identified risk factors for young Queensland drivers.

Crash data attributed to identified contributing circumstances has been collated from before the implementation of the new GDL program and then after the implementation of the new GDL program to determine the effects this program has had on addressing fatal and hospitalisation crashes.

A control group of drivers aged 25 – 69 years has also be analysed to establish if any external events may have impacted on the young novice driver data.

This research methodology adheres to World Health Organisation (2010) and to the Institute of Transportation Engineers (2009) recommendations for conducting an impact and outcome evaluation of road safety programs.

The analysis has utilised the Department of Transport and Main Roads crash data base, (Web Crash2). This data base identifies contributing circumstances determined as the predominant cause for the recorded road crashes.

These contributing circumstances have been linked to identified young driver risk factors and an analysis of the crash data has been conducted to determine if there has been a reduction in the number of recorded traffic crashes.

1.5 Conclusions

This study aims to identify the preliminary achievements of the Queensland GDL program at addressing young driver fatal and hospitalisation crash rates.

The review of literature for this research has identified young driver risk factors, components of GDL programs, successes of GDL programs from other jurisdictions, and highlighted the components of GDL programs operating in all states and territories of Australia with particular focus on Queensland.

The outcomes of this study could potentially be used to identify the strengths and weaknesses of the new Queensland GDL program, identifying areas that require further action in order to reduce fatal and hospitalisation crashes resulting from a particular risk factor.

2 Chapter 2: Literature Review

2.1 Introduction

This chapter will review literature to identify the risk factors that have been attributed to be the cause for the overrepresentation of young novice drivers in traffic crashes.

Additionally this chapter identifies GDL as a program that has been successfully implemented in many jurisdictions to reduce the crash rates involving young novice drivers.

After doing this, the chapter will identify the components of GDL programs operating in all States and Territories of Australia with particular emphasis on the new Queensland GDL program.

2.2 Risk Factors

Many factors have been attributed to the cause of young driver crashes. However the majority of research indicates inexperience, deliberate risk taking, less developed visual and perception skills, inability to identify risks and hazards, overconfidence, inattention, driving at high risk times, alcohol and drugs, and choice of vehicle as the significant factors bringing about the high rates of young driver crashes and impacting on the severity of injuries that result from these crashes.

The following paragraphs aim to highlight research justifying why each factor has been identified as a contributing aspect for young driver crash rates.

2.2.1 Inexperience

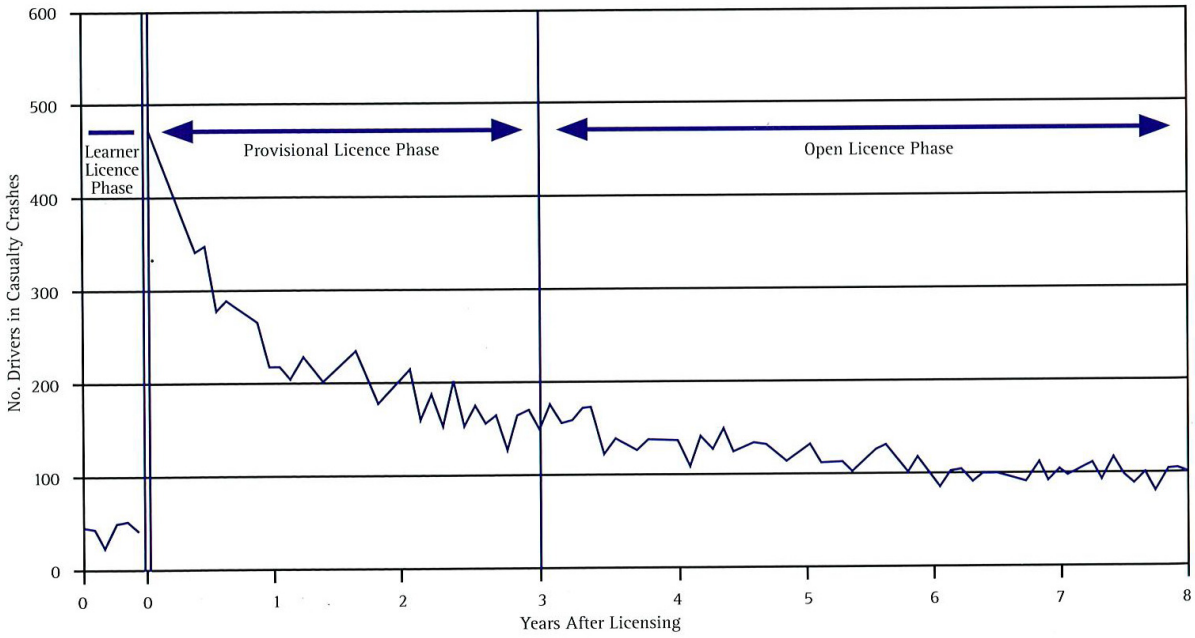
Driving experience is developed through actual driving in the road environment. Consequently new drivers, who have had less exposure to the road environment, have less experience. This lack of experience, according to the California Office of Traffic Safety, results in 16 year old drivers (the age of provisional drivers in California) being 20 times more likely to be killed in a crash than an adult (Opiela, Sant and Childers 2006).

The Queensland Department of Main Roads (2004) supports this view implying that younger drivers, due to inexperience, exhibit slower reaction times with regards to the driving environment. The department continues, identifying young drivers as possessing less well-developed skills and suggesting young drivers do not find it easy to select the appropriate driving behaviour when confronted by various situations. The department argues that young drivers can often suffer from information overload leading to some information being ignored. These statements are supported by data presented by the Travel Safe Committee in the Commission for Children and Young People and Child Guardian 2006 response to Queensland youth: on the road and in control. This data identifies that inexperience was a factor in 70% of all crashes involving 17 to 19 year old drivers from 1996 to 2001.

McKnight and McKnight (2003) argue that research has shown accident rates vary both with experience and maturity however they believe that experience plays the stronger role in preventing crashes for young drivers. An extensive analysis of vehicle crash rates by age and years of driving experience in the UK, conducted by Maycock et al, cited in McKnight and McKnight (2003), revealed that the likelihood of a crash reduced by an average of 30% after the first year of licensed driving.

The Department of Transport (2005) supports this, indicating in **Figure 1** that young drivers in Queensland are most at risk of being involved in a vehicle crash during the first year of their provisional (unsupervised) licence.

Figure 1. Learner, Provisional and Open licence casualty crashes (2001-2003 data)



Source: Department of Transport 2005 page 2

2.2.2 Less Developed Visual Perception and Cognitive Skills

According to the Department of Main Roads (2004), young drivers tend to focus on the immediate task at hand. They do not scan the visual field efficiently and consequently make poor use of peripheral vision. Lee's (2007) research also indicates that the visual search skills of young drivers, at identifying hazards, is less effective than experienced drivers.

McKnight and McKnight (2003) support this. They showed younger less experienced drivers have a significantly greater proportion of their crashes due to lack of visual search prior to left turns (for Australia this correlates to right turns), not watching the car ahead as well as driving too fast for conditions and a failure to adjust to wet roads. A similar conclusion was also reached by Clark, Ward and Jones (1998) who found in a British study that young drivers were more than three times more likely to be involved in right turn crashes.

Lee (2007) states that inexperienced drivers took an average of 250msec longer to respond to peripheral targets/hazards. He suggests that young drivers have not automated many driving skills and lack the spare 'attentional capacity' that enables experienced drivers to respond quickly to peripheral targets. He identifies 'spare attentional capacity' as the difference between cognitive resources demanded by the task and the resources available to invest in the task.

The Department of Main Roads (2004) also state 'many young drivers have under developed cognitive and perceptual skills.'

This view is supported by Whissell and Bigelow (2003) who argue that young drivers tend to be cognitively less mature in their general decision-making abilities. They further claim that car crashes involving young drivers are positively correlated with decisional driving error. Ferguson, cited in Prato et al (2010), also identifies cognitive aspects, such as a lower ability to assess driving hazards and a higher tendency to perceive a crash risk as low, as reasons to explain the over representation of young drivers in road crashes.

Twisk and Stacey (2007) and Mandic and Ridgeway (2010) further emphasise maturity issues indicating that current research suggests those parts of the brain responsible for decision making and controlling impulses are not fully mature until an individual reaches their early to mid-twenties.

2.2.3 Deliberate risk taking

Sabey and Tayloy, cited in Ulleberg and Rundmo (2003), concluded from a study of 2041 traffic crashes that human factors contributed to 95% of all crashes. In particular they identified driving behaviour as the most central of these risk factors.

Travelling at inappropriate speeds is one form of risky driving behaviour. It refers not just to exceeding the speed limit but also to travelling too fast for the conditions. Excessive speed for the road conditions is considered one of the most common contributors to road crashes, regardless of age (Machin & Sankey 2008). Chisholm and Naci (2008) report that exceeding the speed limit is probably the most common form of traffic violation and contributes significantly to the overall road toll in all regions of the world. Finch et al, cited in Giles (2004) found that one-third of road deaths could be attributed to speeding.

Gonzales et al cited in Chen et al (2010) identify excessive speed as a major contributing factor for young driver crashes and a survey conducted by Vassallo et al (2007) on young Australian drivers' behaviour reported 80% of participants had driven at speeds exceeding the posted limit by at least 10km/h during their past 10 trips. However, WHO (2009) report that a 5% increase in average speed leads to a 20% increase in mortality. Coupled with speeding is evidence indicating that teenage drivers and passengers use seat belts less often than older drivers, increasing the risks associated with speed (Ferguson 2003).

A survey conducted by Tay et al cited in Tay (2005) found many young drivers in Australia believe that they were able to avoid detection for speeding by being more vigilant and looking out for speed radars. Tay also reports that speeding among young drivers was considered socially acceptable if the driver could safely do so. Stead et al cited in Machin and Sankey (2008) suggest that speeding does not suffer from the same stigma as drink driving and is therefore accepted by the majority of drivers. Clarke et al cited in Machin & Sankey (2008) indentified speeding as the most common driving offence for young drivers.

Perceptions recorded by Tay (2005) indicate that many Australian drivers believe anti-speed enforcement is implemented more for the purpose of revenue raising instead of road safety and that these attitudes were especially prevalent among young male drivers.

Aggressive driving has also been implicated as a major factor for risky driving. Ulleberg and Rundmo (2003) report that attitudes towards traffic safety have been found to correlate with aggressive driving behaviours. Aggressive driving manifests itself in many forms ranging from outright road rage to driving at inappropriate speeds. Behaviours like tailgating fall into this realm.

Arnett, cited in the Department of Transport and Main Roads (2009c), suggest that being young and aggressive and taking more risks should not be unexpected. He reports that increased testosterone (hormone linked with aggression) and decreased serotonin (hormone that regulates moods) is evident during the late teens.

Aggressive driving according to Whissel and Bigelow (2003) also has obvious links with sensation seeking. Sensation seeking is a personality trait where people tend to seek intense sensations and experiences. Sensation seekers tend to underestimate the likelihood of negative consequences from hazardous behaviour and the threat it presents to theirs and their passengers' lives (Prato et al, 2010). Young people generally report greater sensation seeking behaviour than older people, (Department of Transport and Main Roads, 2009c).

Whissel and Bigelow (2003) suggest there is evidence that high sensation seekers may have a neuro-chemical basis for their risk taking behaviour in terms of lower levels of monoamines (neurotransmitters that affect mood). This high sensation seeking demand, linked with immature decision making, presents a potentially lethal mix for young driver safety.

2.2.4 Inability to identify risk or hazards

The available literature indicates that young drivers either rate situations as less risky than they are or that young drivers are unable to identify the risk associated with particular actions.

Fergusson (2003) suggests young people differ in the way they define safe driving and consequently risk. He states that younger drivers tend to rate hazardous situations as less risky than older drivers.

Brown and Groeger, cited in Ulleberg and Rundmo (2003), support this suggesting that young drivers are more likely to underestimate the probability of the specific risk caused by traffic situations. Boyce and Geller cited in McKnight and McKnight (2003) found the behaviour of young drivers to be characterised by higher speeds and closer following distances than older drivers. Summalla and Wilde cited in Whissell and Bigelow (2003) argue that accident prone young drivers and youth in the workplace tend to distort the actual safety risks that their behaviour may incur. McKnight and McKnight cited in Ferguson (2003) reported deficits in a young drivers ability to identify potential risks on the road.

This argument is expanded upon in the Department of Transport and Main Roads (2009c) where it is suggested that young drivers, who tend to have a greater misunderstanding of crash risks, engage more in risky driving behaviour. However McKnight and McKnight (2003) concluded in their review of a sample of crashes involving young novice drivers from California and Maryland that only a small minority of the crashes reviewed resulted from what could be deemed deliberate risk taking. Instead they attribute most crashes result from a failure to employ routine safe operating practices due to an inability to recognise the risk involved.

Milech et al, cited in Ulleberg and Rundmo (2003), support this view, stating that young drivers tend to perceive the hazards in traffic less holistically. Castella and Perez cited in Machin and Sankey (2008) also identify that young drivers involved in high levels of speed underestimate the potential risk of driving situations and Rhodes, Brown and Edison (2005) conclude that young drivers in general do not see certain behaviours while driving as particularly risky, such as driving with multiple friends, loud music, or eating while driving.

2.2.5 Overconfidence

According to the Department of Main Roads (2004) young drivers tend to exhibit traits of impulsive driving, display poor risk management and a lack of strategic driving skills. Brown, cited in Clarke, Ward and Truman (2005), suggests that one of the reasons young drivers exhibit such traits is due to overconfidence in their control and recovery skills. Brown continues by stating that '*relatively naive drivers tend to create accident opportunities for themselves because they often over-estimate their ability to recover from error'*.

Castella and Perez, cited in Machin and Sankey (2008), support this by stating '*young drivers who drive at excessive speed over-estimate their level of skill and underestimate the risks involved'*. Moe, cited in Ulleberg and Rundmo (2003), also supports Brown by stating '*young drivers overestimate their own driving skills'*.

The Department of Transport (2004) further refine demographic groups prone to overconfidence by highlighting that young male drivers in particular often overestimate their ability and therefore their ability to correct a situation. Deery, cited in Clark, Ward and Truman (2005), supports this view suggesting that people are generally overconfident about their level of skill but young males especially have a higher degree of risk acceptance while driving.

Overconfidence is strongly linked to deliberate risk taking.

2.2.6 Inattention / Distraction

Distraction is a substantial safety problem. Numerous authors in Lee (2007) indicate between 13% and 50% of all crashes are attributed to driver distraction or inattention. In 2009, one in every ten deaths on Queensland roads was the result of drivers being distracted (Department of Transport and Main Roads, 2009b).

Driver distraction may contribute in one of four ways:

- Visual distraction: when the driver's eyes are diverted from the road ahead to another object inside or outside the vehicle.
- Auditory distraction: attention is diverted from the road to listen to sounds such as the radio or passenger conversations.
- Attentional / Cognitive distraction: When the thoughts of the driver absorb attention to the point where driving performance is impaired
- Physical Distraction: removing one or both hands from the wheel to manipulate another object, i.e. changing radio station.

These factors impact on all drivers regardless of age or experience. However, Dr Michael Regan of Monash University, cited in The Commission for Children and Young People and Child Guardian (2006), reports that young drivers are particularly vulnerable. He states that young drivers are more willing to engage in distracting activities and embrace new technologies that present distraction risks.

The high take up of new technologies by teenage demographics, linked with developing driving skills therefore places young drivers at a higher risk of distraction.

A report by Telstra, cited in Lee (2007), indicates that 30% of people surveyed had used text messaging while driving and that 16% regularly used text messaging while driving. Lee (2007) indentifies all forms of infotainment technologies, of which mobile phones are a part, exacerbate all risks factors for driving and undermine the safety of young drivers.

2.2.7 Tendency to drive at high risk times (e.g. at night with a number of young passengers)

Research suggests serious crashes involving younger drivers tend to occur at night and with passengers of similar age (Department of Transport and Main Roads, 2009c; Doherty and Andrey, 1997).

Clarke, Ward and Truman (2005) suggests the reason for increased young driver crashes during darkness is caused by the purposes for which young drivers are on the road during these hours, not the time of day. They highlight increased young driver crashes during night time driving is not caused by darkness but rather the purpose for which young drivers are on the road during these hours and the manner in which they drive while there. These include driving for social purposes and driving for pleasure.

Williams, cited in The Commission for Children and Young People and Child Guardian (2006), also recognises the increased risk associated with driving for social purposes. However he indicates that the complexity of night time driving, lack of experience with night time driving and fatigue also play a role in increasing the risk factors. In fact a survey of young drivers conducted by Vassallo et.al (2007) indicated that two-thirds of participants reported that they had driven when very tired at least once in their last 10 trips. However it must be remembered that fatigue can play an impact regardless of the time of day.

Driving for social purposes and pleasure tends to involve peer passengers. This is supported by the Commission for Children and Young People and Child Guardian (2006) who indicate that teenagers are more likely to be passengers in transport incidents.

So who are considered 'peer passengers'? The Department of Transport (2005) indentifies peer passengers as someone under the age of 21 and not a family member.

According to Lin and Fearn, cited in Lee (2007), passengers of the same age dramatically undermine the safety of young drivers. Lee further elaborates indicating that teen passengers have such a detrimental effect because they can influence the driver at all levels of control, from distracting them from the driving task to inducing greater risk taking behaviour. Hedlund (2007) supports this indicating that each additional passenger increases the crash risk for teenage drivers.

Engstrom et al (2008) however identify that some studies indicate passengers present a protective factor, but clarifies by indicating the negative effect on young drivers is associated with the number and identity of the passengers. Doherty and Andrey (1997) agree stating that in terms of young drivers, it is generally believed that adult accompaniment has a safety benefit while the presence of peers has the opposite effect.

A study by Simons-Morton, Lerner and Singer (2005) found young male passengers led both male and female teen drivers to drive faster. They further elaborate indicating that when two or more peer passengers travel with a young driver there is a two to three fold increase in fatal crash risk. This is supported by Ouimet et al (2010) who concluded that teenagers, especially males, drive at higher speeds and with smaller headways when carrying male teenage passengers. They found higher fatalities for young male drivers occurred when one or more of the passengers were male.

The task of driving at night time presents very few additional dangers to driving during the day time. Research indicates it is not the lack of day light but the attitude towards driving at night that increases the risk of crashing. Factors such as increased speed, alcohol and drugs, and recklessness is what places young drivers at risk during night time driving.

2.2.8 Alcohol or drugs

In the 2002 and 2003 U.S. National Survey on Drug Use and Health of over 32,000 persons aged 16-20, 21% reported that they had driven in the past year under the influence of alcohol or drugs (Hedlund et.al, 2006).

The use of alcohol and or drugs significantly impacts on driver performance regardless of age or experience. Alcohol can, in small amounts, act as a relaxant, giving the sensation of improved mood. But even small amounts of alcohol have a deteriorating affect on judgement and decision making. Large amounts of alcohol have a more pronounced affect, impacting on muscle co-ordination, slowing reflexes, impairing vision and hearing and diminishing the brains ability to process information (CIV3703, 2010).

Twisk and Stacey (2007) indicate that young drivers are more susceptible to the effects of alcohol, even at lower levels, increasing the danger alcohol poses. Doherty and Andrey (1997) support this, indicating that the risk of crash involvement is higher for young drivers at any blood alcohol level.

The effects alcohol presents to driving have been well documented but drugs, both legal and illegal, also impact on driver performance. Illegal drugs such as marijuana, amphetamines, cocaine and opium have been shown to have dramatic effects on driver performance.

Studies indicate the effects of these drugs range, depending on the type and dose, from dramatic increases in high risk driving behaviour (cocaine and amphetamines) to severe muscle co-ordination, visual and auditory impairment and even hallucinations (marijuana and opium).

However it is not just illicit drugs. Some legal prescription drugs also have a negative impact on driver behaviour and performance (CIV3703, 2010).

Vassallo et al (2007) suggests that young people who take risks with driving are also more likely to engage in other risky behaviours, like drug use. Drugs and alcohol will impair a driver's ability regardless of age. However when linked to developing skills and the propensity to take risk, they dramatically increase the risk of crash involvement for a young driver.

While the wider community generally look upon driving when under the influence of alcohol and/or drugs with distain, the Department of Transport and Main Roads (2009c) indicate young people have a greater tolerance for these less socially acceptable behaviours and risks. They further add that young drivers are more likely to drive under the influence of alcohol if they have more positive expectations about rewards that may result from the risk; social rewards that can be extracted from conforming / performing for peers.

Armstrong et al, cited in the Department of Transport and Main Roads (2009c), indicate many young drivers perceive the social rewards from drug driving exceed the punishments that can result and Hedlund, Shults and Compton (2006) indicate that alcohol and drug driving has strong connections with sensation seeking. The Department of Transport and Main Roads (2009c) also adds that young male drivers were less likely than young female drivers to believe drink driving was dangerous.

2.2.9 Choice of Vehicle

The literature indicates that young novice drivers tend to drive older and smaller vehicles (Department of Transport and Main Roads, 2009c; Ferguson, 2003).

However smaller vehicles provide less protection for occupants than larger vehicles (Ferguson 2003). Additionally, older vehicles tend not to be fitted with crash protection and driver assist features that are standard on newer vehicles; consequently they provide less protection for vehicle occupants before and during a crash (Ferguson, 2003; Department of Transport and Main Roads 2009c).

Twisk and Stacey (2007) and Keall and Newstead (2011) support this stating that for economic reasons young people tend to drive older vehicles with fewer safety features.

However vehicle design plays a key role in reducing the severity of injury resulting from a crash for passengers, drivers and other road users.

Newer technologies that support the driver and/or protect vehicle occupants and other road users, such as electronic stability control (ESC), anti-lock braking system (ABS), and crumple zones, plus emerging technologies like collision warning systems and intelligent speed adaption can enhance driving safety and according to Lee (2007) even mitigate some of the risks associated with young drivers.

While age and size of vehicle is one element of vehicle choice, performance is another.

There is significant anecdotal reporting in the media suggesting vehicle performance is a factor leading to young driver fatalities. But Yannis, Golias and Papadimitriou, cited in Hedlund et al (2006), concluded from an investigation in to the combined effects of driver age and engine size for motorcycle crashes in Greece, that engine size had no effect.

Clarke, Ward and Truman (2005) also indicated that young drivers of performance cars are no more likely to exhibit skill deficits in their crash involvement than other young drivers however they conclude that young drivers of high performance cars tend to engage in higher levels of voluntary risk taking leading to a higher proportion of more severe crashes. This view is supported by Corbett in Giles (2004) who, after conducting a study on the effectiveness of speed cameras at reducing speed, found that 65% of drivers of high performance vehicles either ignored speed cameras or only temporarily slowed their speed.

2.3 Graduated Drivers Licence (GDL)

Many strategies have been implemented worldwide with varying levels of success aiming to reduce the number of serious crashes involving young drivers. These strategies have ranged from school based education programs aiming to improve young driver awareness to specifically targeted advertising campaigns. Advertising campaigns have ranged from shock and scare tactics to humorous but with a serious message, (Tay, 2005; Sibley, 2009; TMR, 2010; Department of Transport and Main Roads, 2009c).

Most of these strategies targeted one type of risk at a time, however over the last 10 to 20 years there has been increasing recognition for the need to develop a more systemic approach to addressing risk factors associated with young drivers. Graduated Drivers Licensing programs (GDL) are programs attempting to do just that.

GDL programs differ from region to region however they do tend to have some similarities. In their most basic form GDL programs generally involve a three stage licensing system consisting of an extended learner's period, an intermediate licence stage and a full licence. GDL licence holders are required to not only adhere to all standard traffic and licensing regulations but also have special restrictions and criteria that specifically apply to the stage of licensing the novice driver has achieved.

GDL differs from traditional probationary/provisional licence systems by the systemic, step wise approach to full licence status.

The learners permit allows driving only while supervised by a fully licensed driver and the intermediate licence allows unsupervised driving under certain conditions / restrictions. Both the learners permit and the intermediate licence have minimum age requirements and must be held for a specified minimum period of time with licensing privileges curtailed or removed if driving infringements are recorded. Progression from one stage to the next is only possible after successful completion of all requirements of the preceding stage.

GDL programs, according to Doherty and Andrey (1997), aim to target high risk driving situations for young drivers by focussing on the principles that '*driving is a privilege, not a right*' and that those new to driving should '*walk before they run'*.

Doherty and Andrey (1997) suggest that GDL programs impose restrictions on new drivers that theoretically allow them the opportunity to gain experience in environments where risk is minimised.

Restrictions they identify that aim to reduce risk are:

- What (e.g. type of vehicle),
- When (night time or after drinking alcohol),
- Where (roadway restrictions e.g. high speed environment restrictions),
- Why (certain trip purposes),
- With whom (number and/or characteristics of passengers).

The United State's Insurance Institute for Highway Safety also defines good GDL programs as requiring at least a 6 month learning period, and either prohibiting driving between 10pm and 5am or allowing only one passenger during unsupervised driving times. They also stipulate that an unrestricted licence should not be issued prior to the age of 17, (Morrisey et al, 2006).

2.3.1 Arguments surrounding GDL components

How safely someone drives is based on a combination of factors in which driving skill is only one element. Unsafe driving arises not only from a lack of skill but also from attitudes about driving, including perceptions about the likelihood of being involved in a crash and beliefs about what safe driving involves. Historical approaches to driver education focussed only on skill development however GDL does not.

GDL programs aim to address young driver attitudes and perceptions of risk by establishing additional steps that need to be addressed in order to gain full licensing rights. However there are several arguments that surround the perceived benefits of various GDL steps. The following sections aim to highlight some of those issues.

2.3.1.1 Increased Learner Period and Hazard Perception/Secondary Level Training

Safe drivers are made, not born. Encouraging high levels of practice increases young novice drivers experience before they start to drive solo. Additionally the extended learner period allows time for the inclusion of higher level driving skills like hazard recognition and self assessment. Plus it also increases the minimum age for solo licensure allowing additional time for cognitive development. Studies from around the world indicate that increasing driver practice reduces crash risk after licensure (Twisk and Stacey, 2007).

Mandating a long learner period also, according to Foss (2007), encourages young drivers to obtain a wider range of experience with driving in different environments before they move to driving without supervision.

While most literature recommends at least 50 hours of pre-licensing practice, studies in Sweden show that increasing this to 120 hours can further reduce crash risk following licensing (Twisk and Stacey, 2007).

Feguson (2003) agrees, indicating that the longer periods of supervised driving included in GDL programs addresses risky driving that is a function of inexperience. However she states that risky driving resulting from 'youthful exuberance' and a 'greater tendency to take risks' requires additional motivation to ensure young drivers drive in a more cautious manner. Ferguson identifies the threat of meaningful penalties as the required powerful motivator.

Males (2007) also cautions that the extended learner period stage of GDL programs runs the risk of perpetuating bad intergenerational driving habits rather than mitigating them when parents or other unqualified adults are deputised as driving instructors for novice teenage drivers.

Other programs such as advanced driver training have also been found to be counter-productive, particularly if they focus on vehicle skills, as they increase the young driver's confidence, potentially increasing the risk of crashing (Twisk and Stacey, 2007).

The ability to detect and identify potential hazards is a skill, research indicates, that novice drivers generally have not fully developed. Many GDL programs aim to address this by including specific hazard perception training as part of a secondary stage driver education component of the GDL program (Ferguson, 2003).

The approaches range from formal in-class courses (Michigan USA) to second stage driver tests (New Zealand) to computerised testing and skill development, (New South Wales, Queensland and Victoria). Ferguson (2003) indicates that laboratory studies indicate many of these approaches appear promising however she concludes that further research is required.

However Sagberg and Bjornskau, cited in Twisk and Stacey (2007), found that a hazard perception test does not result in any important safety improvements in the first nine months after licensing. But Fisher, Pollatsek and Pradham, also cited in Twisk and Stacey (2007), found that after young drivers had attended computer based training programs focussing on recognising potential risks, substantial improvements in their scanning behaviour on open roads was recorded.

2.3.1.2 Vehicle Restrictions

The RACQ (2003), in their report to the Travel Safe Committee, suggest that efforts to restrict probationary drivers from 'performance vehicles' will have a minimal effect considering the acceleration rates and top speeds of most vehicles, regardless of engine capacity and power.

However, as mentioned earlier, Clarke, Ward and Truman (2005) and Corbett, cited in Giles (2004), indicate that young drivers of performance cars tend to engage in higher levels of voluntary risk taking leading to a higher proportion of more severe crashes.

2.3.1.3 Night Driving and Passenger Restrictions

Most GDL programs identified in this literature review have contained some measures aimed at:

- limiting the number of passengers in the vehicle, with the goal of reducing the distractions and negative peer influences faced by the inexperienced driver,
- restricting the time when young drivers can drive.

Research, highlighted by the Commission for Children and Young People and Child Guardian (2006), indicates that night time crashes are more than twice as likely as daytime crashes and that peer passengers significantly increases crash risk. They conclude that night time driving and peer passenger restrictions are considered the most beneficial elements of graduated licensing by reducing young drivers exposure to these risky environments.

Hasselberg and Laflamme (2009) support this, stating that night time driving restrictions have shown to be one of the most effective crash preventative measures among newly licensed drivers. But Chen et al (2010), while acknowledging that night time driving restrictions have been effective in reducing crashes among young drivers worldwide, questions the overall effect such restrictions would have in an Australian context.

Ferguson (2003) also questions whether GDL night driving restrictions can actually address fatigue issues, an issue that night time crashes are often attributed to. She states that while night time restrictions address night time drowsy driving they have no effect on day time drowsy driving.

The Commission for Children and Young People and Child Guardian (2006) also identifies that in 2005-2006, while Queensland teens were at greatest risk of involvement in a fatal crash between 10pm and midnight on a Saturday, the greatest number of fatal crashes involving teens actually occurred between 9am and 3pm on any given day.

Morrisey (2006) also concludes that passenger restrictions simply put fewer teens at risk of a fatal crash rather than substantially reducing the distraction factor associated with others in the vehicle.

These views are supported by Mandic and Ridgeway (2010) who state that GDL programs restricting passenger numbers have little impact on the number of teen driver fatalities however they do state that there is a reduction in the number of passenger fatalities.

The Commission for Children and Young People and Child Guardian (2006) also concedes that reductions in young driver crash rates resulting from passenger and curfew restrictions are the result of reduced exposure rather than safer driving.

Shoe and Molnar (2004) however identified that GDL programs in the United States have reduced the number of crashes involving passengers and Hedlund, Shults and Compton (2003) state that research has established conclusive evidence that night time driving restrictions reduce crashes.

2.3.1.4 Alcohol Restrictions

Twisk and Stacey (2007) and Doherty and Andrey (1997) indicated that young drivers are more susceptible to the effects of alcohol, even at lower levels, increasing the danger that alcohol poses.

All GDL programs identified aim to remove the impact alcohol can have on driving ability by imposing strict blood alcohol restrictions. These restrictions can only have a positive effect on driving ability and performance.

2.3.1.5 Restricting the environments in which novice drivers can drive in

While some jurisdictions restrict beginner drivers to lower speeds or even lower speed roads, according to Hedlund, Shults and Compton (2003), there is little evidence of the effectiveness of these measures.

Doherty and Andrey (1997) concluded, in their study of the GDL program in Ontario Canada, that restricting novice drivers to low speed roads actually increases cash risk due to road design. They highlight that low speed roads tend not to have the design protection factors that are inherently incorporated into high speed road design, safety factors that make the road safer, even though the speed environment is faster.

Additionally, reducing speeds can present congestion issues pertaining to traffic flow, particularly in areas where there is a single lane dual carriage way. This congestion can then lead to risk taking by other motorists in efforts to overtake the speed restricted driver.

Doherty and Andrey (1997) do however concede that there is considerable support for speed restrictions as they conform with the ‘walk before you can run’ approach to GDL development.

2.3.1.6 Enforcement

In many jurisdictions, advancement through the graduated licence program is contingent on the young driver recording no driving infringements.

This punitive approach to compliance is supported by Whissell and Bigelow (2003) who report that drivers in general tend to reduce their excessive speeding and other risky activities after punitive measures are imposed. Williams (2007) also concludes that restricting young drivers advancement through a GDL program if driving infringements are recorded should motivate teenage drivers to drive safely and obey the rules.

However enforcement of some GDL components will always be difficult. Police cannot tell if an unsupervised teen driver is violating GDL laws without actually stopping the vehicle. This is particularly difficult when considering night time driving and passenger restrictions.

Scott-Parker, Watson and King (2009) support this, emphasising that the threat of police detection for risky driving is extensively relied upon to curtail risky young driving behaviour, but adds that young drivers are less likely to comply with road rules if the anticipation of punishment is low.

Ferguson (2003) also reports that there is evidence that many of the night time and passenger restrictions, aimed to reduce the incidence of driving under these conditions, are regularly flouted.

This is where parents need to be involved. Parents play a central role in the licensing process, both providing supervision and ensuring compliance with licensing provisions. Several recent studies concluded that risky driving, traffic infringements and crashes are lower among teens whose parents set strict driving conditions and expectations, (Hedlund 2007).

Therefore the introduction of young driver measures needs to be accompanied by effective awareness raising campaigns not only targeting young drivers but (and perhaps even more importantly) directed at parents, politicians and other stakeholders (Twisk and Stacy, 2007).

2.3.2 Success of GDL Programs around the World

GDL programs have been implemented in many jurisdictions throughout the world including the USA, Canada, New Zealand, Israel and Australia to name a few. While the programs differ from region to region they all follow the same principal. To develop young driver's skills through a procession of steps, aimed at providing young drivers the opportunity to gain experience in environments where risk is minimised.

GDL programs are unique in the history of traffic safety in the size of the effect they have had on reducing accidents among their target group.

In the United States for example North Carolina's GDL laws reduced the rate of fatal crashes involving 16 year old drivers by 57% (Shope and Molnar, 2003).

After implementation of California's GDL program there was a 24% decline in crashes where the young driver was considered 'at fault' and fatality rates for 16 year old drivers decreased significantly (Shope and Molnar, 2003; Males, 2007).

Ohio's GDL program saw a reduction of 23% in crashes involving 16-17 year old drivers (Shope and Molnar, 2003).

Florida's GDL reforms reduced the crash rates among 15-17 year old drivers by 9% (Morrisey et.al, 2006).

Michigan's program reduced the crash rate for 16 year old drivers by 25% (Shope and Molnar, 2004).

Pennsylvania saw a 27% reduction in crashes and 58% reduction in fatalities since the implementation of their GDL program (Shope and Molnar, 2003).

Iowa's GDL program reported reductions in crashes involving 16 and 17 year olds (Williams and Schults, 2010).

O'Conner, Lin, Tinkoff and Ellis (cited in Williams and Schults, 2010) found reductions in crash rates and hospitalisation rates resulting from vehicle accidents among 16 and 17 year olds in Delaware following the introduction of graduated licensing.

Williams and Schults (2010) indicate GDL programs lead to a reduction in police reported crashes and fatal crashes in New Jersey.

Dee et al (2005), cited in Morrisey et al (2006), concluded that good GDL programs implemented in the USA have reduced motor fatalities involving 15–17 year old drivers by 19%.

Mandic and Ridgeway (2010), concluded from their analysis of 12 different GDL programs that teen fatalities reduced after the GDL programs were implemented.

Morrisey (2006) also concludes that GDL programs categorised as good by the Insurance Institute for Highway Safety were estimated to reduce motor vehicle fatalities among 15-17 year old drivers in the USA by 19.4%.

Williams and Shults (2010) further add that at the 2007 Tucson symposium Shope concluded, from a review of 27 studies completed since 2002, that GDL programs reduced crash involvement of young drivers in the USA by 20–40%.

However some of the literature concludes that the GDL programs implemented in the United States may have an adverse impact on driver safety.

Males (2007), for example suggests the Californian GDL program has merely shifted the dangers of risky behaviour from 16 year olds to 18 year olds, (age of full licensure under the Californian system).

Hedlund, Shults and Compton (2006) however rebut this indicating that GDL systems, defined as any system with an intermediate licensing phase, reduced traffic fatalities among 15-17 year olds by at least 5.6% and did not increase fatalities among older teens.

GDL successes are not only limited to the United States. In jurisdictions outside of the United States, evaluations have reported declines in accidents involving young novice drivers ranging from 7% to 37% (Schope and Molnar 2004).

Begg and Stephenson (2003) indicate that immediately following the introduction of the GDL program in New Zealand there was a marked decrease in the rate of 15-19 year old drivers involved in crashes reported to the police. Additionally they add there was also a reduction in admissions to hospital for crash related injuries for this age group. In the 12 years since implementation the number and rate of fatality or seriously injured motor vehicle occupants aged 15-24 years of age in New Zealand has nearly halved (Begg and Stephenson, 2003).

While Begg and Stephenson (2003) acknowledge there are a range of factors other than GDL which have contributed to this result they conclude that GDL is the most important factor influencing this outcome.

Doherty and Andrey (1997) support this indicating that evidence from New Zealand suggests that casualties (fatalities and injuries combined) dropped initially by about 25 percent for young drivers and, although the long term rates have been lower, continue to show a positive impact on young driver crash rates (Doherty and Andrey, 1997).

Prato et.al (2010) while providing no actual percentage, conclude that the higher level of experience acquired during the supervised period of the Israeli GDL program lowers the risk indices for young drivers during the solo driving period.

Twisk and Stacey (2007) highlight that alterations to the practice driving period in Sweden reduced the crash risk for young drivers by 40%.

Winkelbaum, in Twisk and Stacey (2007) identify a more than 50% reduction in crashes after the implementation of an Austrian graduated training scheme however they do acknowledge the results may reflect some volunteer bias.

Doherty and Andrey (1997) indicate the Ontario, Canada GDL program reduced crash involvement by 9%, casualty crash involvement by 10% and fatal crash involvement by 24%. Williams and Shults (2010) identified that the Saskatchewan, Canada, GDL program reduced at fault crashes and injury crashes among novice drivers.

Williams and Shults concluded from their analysis of the literature that populations targeted by GDL programs experience significant reductions in crash rates. They do however concede that it is unclear whether the crash reduction effects of GDL persist beyond the time young drivers receive full licence privileges.

However Begg and Stephenson (2003) suggest that drivers in New Zealand, who began driving under GDL, have lower crash rates in later years than similar aged non GDL drivers.

2.3.3 Graduated Licence Schemes Operating in Other Australian States and Territories

Graduated licensing programs are not new to Australia. The concept of a GDL was first raised as part of the Federal Government's Road Safety Initiative in December 1989. This Road Safety Initiative stipulated that all States and Territories were required to adopt a GDL program that reflected the Federal Governments proposed program. The components of the Federal Government Graduated Licensing program were:

- zero blood alcohol concentration (BAC) for learner drivers
- zero BAC for the first three years after obtaining a non-learners licence up to 25 years of age
- no learners' permits to be issued before 16 years of age
- no probationary licence to be issued before 17 years of age
- the minimum period for a learners' permit to be six months
- licences issued for automatic vehicles to apply for the probationary period unless a manual test is undertaken or other requirements, specified by the State or Territory, are met.

(Monash University Accident Research Centre, 2005).

As a consequence of this initiative, all Australian States and Territories have implemented GDL programs and, over the last 20 years, have further refined these programs.

While most elements of the State and Territory programs are similar there are some minor differences.

2.3.3.1 Victoria

The current Victorian graduated licensing program commenced on 1st July 2008. According to Vic Roads (2010) and Youth Central (2010) the Key features of the Victorian GDL program include:

- Written test required to obtain a learners permit.
- A minimum 12 month learner period.
- Compulsory 120 hours of logged supervised driving during the learner period. Of these 120 hours at least 10 hours must involve night time driving.
- A computerized hazard perception test as part of the probationary driving test.
- A two stage probationary drivers licence system. First stage (P1) is one year. Second stage (P2) is two years.

- P1 drivers permitted to carry only one passenger aged between 16 and 21.
- For P1 drivers, mobile phone use, including hands free and hand-held, or any messaging of any kind, is not allowed.
- P1 drivers are prohibited from towing anything unless under supervision or work related.
- P1 and P2 drivers are prohibited from driving certain types of vehicles.
- To progress to a full licence, probationary drivers must record no speeding, drug, drink or other driving offences. If offences are recorded, that do not result in the suspension of the licence, then the probationary period is extended.
- No blood alcohol volume is permitted during P1 and P2 period.
- Licence must be surrendered if five or more demerit points are accrued in one year.
- All other road and licensing rules apply.

(Vic Roads, 2010).

2.3.3.2 New South Wales

On the 19th December 2009 the NSW government refined their GDL program.

The new GDL program, like the original GDL program, consisted of three beginning driver stages:

- Learners permit.
- Provisional licence 1 (P1).
- Provisional licence 2 (P2).

However the new learners' period was extended to a minimum of 12 months and required a minimum of 120 logged hours of driving practice (later reduced to 100). At least 20 of these hours had to involve night time driving. This lengthening of the learners' period resulted in solo driving not being permitted until the learner driver was at least 17 years old.

In an effort to encourage professional driving instruction, lessons conducted by a professional instructor accrue log hours at an increased rate of 3:1. However the fast tracked rate is limited to a maximum of 30 logged hours; 10 hours of professional instruction. Additional professional lessons conducted over the 10 hour threshold are only accrued at a 1:1 ratio (Transport Roads and Traffic Authority, 2011).

Restrictions that apply to learner drivers are as follows:

- Be supervised at all times by the holder of a full Australian drivers licence.
- Have L plates displayed on the front and rear of the vehicle or have an L sign on the roof.
- Observe a maximum speed limit of 80 km/h, even if the posted speed limit exceeds 80km per hour.
- Not tow any other vehicle.
- Not exceed a zero blood alcohol concentration.
- Only drive vehicles that have seat belts fitted.
- Not use any functions of a mobile phone including hands free devices.

The learner licence is suspended or refused if four or more demerit points are accumulated, (Transport Roads and Traffic Authority, 2011).

After completing all the learner licence requirements, a learner driver sits a practical driving exam. If they are successful with this practical driving test they are issued with a P1 provisional licence.

Restrictions imposed on P1 drivers are:

- Have P plates (red P on white background) displayed on the front and rear of the vehicle and, if towing, a P plate must be on the back of the trailer.
- Not exceed a zero blood alcohol concentration.
- Observe a maximum speed limit of 90 km/h, (even if posted speed limit is higher).
- Observe towing restrictions (only permitted to tow light trailers up to 250 kilograms unloaded weight).
- Not upgrade the licence to a higher class.
- If aged under 25, only carry one passenger under the age of 21 between 11pm and 5am.
- Only drive vehicles that have seat belts fitted.
- Not use any functions of a mobile phone including hands-free devices.
- Not drive certain prohibited vehicles.

Like the learners' permit, P1 licences are suspended if four or more demerit points are accumulated. Additionally a P1 licence holder will have their licence suspended for at least three months for any speeding offence.

To progress to a P2 licence, P1 drivers must pass the Hazard Perception Test (HPT). The HPT is a touch-screen computer test which measures a driver's ability to recognise and respond to potentially dangerous situations (Transport Roads and Traffic Authority, 2010a).

Restrictions still apply to P2 drivers however they are not as restrictive as P1 restrictions. P2 restrictions are:

- display P plates (green P on a white background) on the front and rear of the vehicle and, if towing a trailer, a P plate must be on the back of the trailer.
- Not exceed a zero blood alcohol concentration.
- Observe a maximum speed limit of 100 km/h.
- Only drive vehicles that have seat belts fitted.
- Not drive certain prohibited vehicles.

P2 licences are suspended if a threshold of seven demerit points is reached or exceeded. Speeding infringements incur a minimum of four demerit points but excessive speeds, 30km/h over posted limit, results in licence suspension, (Transport Roads and Traffic Authority, 2010b).

2.3.3.3 South Australia

South Australia implemented new rules for drivers with a learners permit or provisional licence on the 4th September 2010. However these changes resulted in only minor alterations to their existing GDL program (Department for Transport, Energy and Infrastructure, 2011a).

Learner drivers in South Australia must be at least 16 years old and have to pass a theory test before receiving a learners' permit.

When driving with a learner's permit L plates must be clearly displayed on the front and back of the vehicle and learner drivers must be supervised by an experienced driver.

Learner drivers are not permitted to drive with any blood alcohol concentration, and are prohibited from using any type of mobile phone function (including hands free) (Department for Transport, Energy and Infrastructure, 2011b).

To progress to the next licensing stage young learner drivers must hold a learners' permit for at least 12 months and completed at least 75 hours of supervised driving (including 15 hours of night driving). Driving supervisors must not have a blood alcohol concentration above 0.05.

The next stage is the P1 provisional licence. To obtain a P1 licence young drivers have two options:

- Pass a practical driving test, or
- Complete a competency based training course.

Like the learners permit, P1 licence holders are not permitted to drive with any blood alcohol concentration and are prohibited from using any type of mobile phone function.

P1 licence holders are also prohibited from driving high powered vehicles and must display a P plate on the front and back of the vehicle (Department for Transport, Energy and Infrastructure, 2011a).

Demerit points are issued for driving infringements and if any points are accumulated the provisional licence must be held for an additional year. If four or more points are accumulated the licence is suspended for at least six months, after which young drivers will have to go through the learners' permit and practical test process again and may have curfew restrictions imposed (no driving from midnight to 5am without a qualified supervisor and no other passengers permitted in the vehicle).

The P1 licence is held for a minimum of one year or until 18 years of age, after which young drivers sit a hazard perception test. The hazard perception test is a computer based ability test aiming to identify if the young driver can recognise dangerous situations when driving and react safely to those situations.

After successfully completing the hazard perception test young drivers progress to a P2 licence. The P2 licence has the same rules as the P1 except no P-plates have to be displayed when driving.

To progress to a full driver's licence, drivers must have held a provisional licence (P1 and P2) for two years with at least six months of that time being a P2 licence. This period is lengthened if infringements are recorded (Department for Transport, Energy and Infrastructure, 2011c).

2.3.3.4 Western Australia

In Western Australia young driver applicants must be at least 16 years old when applying for a learners permit. To obtain a learners permit applicants must successfully complete a theory test on traffic laws and safe driving techniques.

When learning to drive, L plates must be displayed at all times. Learner drivers are restricted to a maximum speed of 100 kilometers per hour, must always have a zero blood alcohol reading when driving and are restricted from driving in certain locations (Western Australian Department of Transport, 2010a).

After holding the learners permit for at least six months learner drivers can undertake a practical assessment. Successful completion of this assessment does not result in a provisional licence but instead results a second stage learners licence where learner drivers are still required to drive under supervision (same requirements as first stage learners) and must complete a minimum of 25 hours of logged supervised driving displaying experience in a range of conditions. Learner drivers must hold this second stage learners licence for at least six months before being permitted to progress to the next stage. This results in no drivers completing their learners stage before they are 17 years old (Western Australian Department of Transport, 2010b).

After completing both learners stages learner drivers sit a hazard perception test. The hazard perception test is a computer based test that displays a series of moving traffic scenes. It is used to determine the learner's ability to assess traffic situations and to make safe driving decisions.

After completing all the steps of the learners permit process, a provisional licence is issued. For the first 6 months of the provisional period, driving between midnight and 5am is prohibited. New drivers must display P plates (white 'P' on a red background) for the first 6 months of the provisional licence period then plates with a white 'P' on a green background for the remainder of the provisional licence period. The provisional period ends after new drivers have held a provisional licence for 2 years. During this time drivers must always have a zero blood alcohol reading when driving (Western Australian Department of Transport, 2010b).

2.3.3.5 Tasmania

Tasmania revised their drivers licensing system in April 2009. Novice drivers in Tasmania now have two learners' permit stages and two provisional licence stages.

Learners at the first stage (L1) have to pass a 'knowledge test' based on road rules. Applicants can sit for this test at 15 years and 11 months however a L1 permit will not be issued before applicants turn 16 years.

After obtaining the L1 licence, learner drivers are permitted to practice driving as long as they are accompanied by a person who holds a full Australian driver licence (other than a restricted, provisional or learner driver licence) to drive a car. The supervising driver must not have had any period of licence suspension for demerit point accumulation or disqualification in the previous two years. Additionally L1 licence holders must display 'L' plates on the front and rear of the vehicle and are not permitted to tow any other vehicle or trailer. L1 permit holders must always have a zero blood alcohol reading when driving and are not permitted to drive faster than 80 km per hour (Department of Infrastructure, Energy and Resources, 2009b).

Learner drivers are 'recommended' to obtain a minimum of 30 hours driving experience before attempting to progress to the second stage of the learners permit (L2). The L1 licence must also be held for at least three continuous months. After completing these requirements applicants can sit the practical test. Learner drivers must pass this practical test in order to gain a L2 licence.

L2 licence conditions are the same as L1 and learners are required hold this licence for at least 9 months. During this nine month period applicants must gain at least 50 hours of logged supervised driving.

After completing at least the minimum L2 requirements applicants can sit the practical driving assessment to obtain the first provisional licence stage (P1). If successful, P1 drivers can drive without supervision however restrictions still apply. P1 drivers have to always display a P plate on the front and back of the vehicle, never drive over 80km per hour (even if speed signs indicate a higher limit) and have a zero blood alcohol content when driving (Department of Infrastructure, Energy and Resources, 2009c).

The P1 licence must be held for 12 consecutive months before being able to progress to the second provisional licence stage (P2). If a P1 driver loses their licence due to traffic infringements they must go back to the learners stage and progress through all the steps again.

P1 drivers automatically progress to a P2 licence after 12 months of continuous P1 licensure. P2 licences, for drivers under 23, must be held for two years. P2 drivers can travel at the posted speed limits (above 80km/h where indicated) but must still have a zero blood alcohol content when driving. If P2 drivers amass four or more demerit points they will forfeit their P2 licence. After drivers have completed the P2 stage requirements they automatically qualify for an unrestricted licence (Department of Infrastructure, Energy and Resources, 2009a)

2.3.3.6 Australian Capital Territory (ACT)

To obtain a Learners Licence in the A.C.T. drivers must:

- Be at least 15 years and 9 months old; and
- Successfully complete a Road Ready Learner Licence Course, which includes a road rules knowledge test.

Learner drivers must:

- display "L" plates on the front and rear of the vehicle;
- ensure that a person holding a full Australian Drivers Licence occupies the seat next to the learner;
- have a blood or breath alcohol concentration of zero when driving or riding;
- not tow a trailer exceeding 750kg GVM.

(Road Transport Authority, 2010a).

A.C.T. learner drivers must be at least 17 years old and have held a Learner Licence for at least six months before they obtain a provisional licence. To obtain a provisional car licence, applicants can either pass a practical driving test with a government licence examiner or undertake training and pass continuing assessment with an accredited driving instructor (the 'log book' system) (Road Transport Authority, 2010b).

Provisional licences are issued for three years and 'P' plates must be displayed on the front and back of the vehicle. If the driver accumulates four or more demerit points during these three years their licence will be suspended for three months. However if, after holding a provisional licence for a period of six months, the driver completes an optional Road Ready provisional licence course, they may remove their 'P' plates. Their demerit points allowance is also increased by four points (Road Transport Authority, 2010b).

All provisional licence holders must have a zero blood alcohol content when driving (Road Transport Authority, 2010b).

2.3.3.7 Northern Territory

On the 1st of July 2007 the Northern Territory Government implemented a graduated licence program (Motor Vehicle Registry Fact Sheet, 2007).

The Northern Territory (NT) GDL program consists of a learners permit period and a provisional licence stage. Drivers can obtain a learners' permit at 16 years of age and must hold it for at least six months. In order to obtain a learners' permit applicants must complete a six hour theory course designed to develop entry-level knowledge of the NT Road Rules and an understanding of Road and Safety Legislation and Duty of Care. Additionally applicants under 17 years of age need a parent or guardian to attend or sign a statutory declaration giving permission for the applicant to obtain a Learners' Licence (Northern Territory Transport Group, 2010a).

When drivers obtain their learners' permit they are issued with a logbook. This logbook contains 22 competencies relating to practical driving techniques. Driving instructors assesses the learner driver against the 22 competencies and sign each competency off as they are met. All competencies must be met in order to qualify for a practical driving test (Northern Territory Transport Group, 2010b).

Learner drivers in the Northern Territory are subjected to the following conditions:

- Zero blood alcohol concentration.
- Not exceed 80 kilometres per hour unless under the direct supervision of an instructor conducting an approved training program.
- Be accompanied (in the passenger seat) by a fully licensed driver at all times whilst driving.
- Display L plates clearly visible to the front and rear of the vehicle.
- Not use any mobile phone function, including hands free, while the vehicle is moving, or is stationary but not parked.

Learner drivers face suspension if they accumulate five or more demerit points in a 12 month period (Motor Vehicle Registry, 2009).

After completing the learners' permit requirements, learners can sit the practical driving test. After passing the practical driving test a provisional licence is issued.

In addition to adhering to general road rules, provisional drivers have the following restrictions:

- Zero blood alcohol concentration.
- Not exceed 100 kilometres per hour.
- Display P plates clearly visible to the front and rear of the vehicle.
- Not use a mobile phone, including hands free, while the vehicle is moving, or is stationary but not parked.

Young drivers, under 25 years of age, are subject to the provisional licence conditions for two years. Provisional licence holders also face suspension if they accumulate five or more demerit points in one year as a result of traffic infringements (Northern Territory Transport Group, 2010a).

2.3.4 Queensland's Graduated Drivers Licence Program

The Queensland GDL (or graduated licensing system GLS) was introduced in July 2007. It consists of four steps:

- Learner licence.
- P1 provisional licence
- P2 provisional licence
- Open licence

To obtain a learners licence applicants must be at least 16 years old and successfully complete a road rules test. When driving, in addition to adhering to general road rules and drivers licence conditions, learner drivers must also:

- Clearly display L-plates at the front and rear of the vehicle,
- Be accompanied by a person who holds and has held an open licence for the class of vehicle they are learning in (for example, automatic or manual), for at least one year,
- Not drive under the influence of illegal or prescription drugs,
- Not use a mobile phone. Passengers and supervisors are also restricted from using a mobile phone in loudspeaker mode while the car is being driven,
- Comply with the no alcohol limit (0.00)

(Department of Transport and Main Roads, 2010a)

Learner drivers must hold a learner licence for at least one year and complete and record at least 100 hours of supervised on-road driving experience in a learner logbook. This must include 10 hours of night driving (Department of Transport and Main Roads, 2010a).

Having completed the 100 hours of logged supervised driving and held a learners licence for 12 months, learner drivers can sit a practical driving test. Successful completion of this test results in the issuing of a P1 licence (Department of Transport and Main Roads, 2010b).

A P1 licence is held for one year (subject to no suspension of licence in this period). In addition to adhering to general road rules and licensing conditions P1 licence holders must:

- Comply with the no alcohol limit (0.00),
- Not teach a learner licence holder to drive,

- Display red P-plates on the front and rear of the vehicle,
- Not use a mobile phone while driving, including the hands-free functions and Bluetooth accessories. Passengers are also banned from using mobile phones on the loudspeaker function,
- Carry only one passenger under 21 years of age (excluding immediate family members) between 11pm and 5am on the next day,
- Not drive high powered vehicles.

(Department of Transport and Main Roads, 2010c).

P1 drivers who accumulate four or more demerit points over a one year period will either:

- Have their licence suspended for three months with a one year late night driving restriction after the suspension or
- Enter into a good driving behaviour (GDB) agreement which also entails late night driving restriction.

Late night driving restrictions prohibit the driver from driving between the hours of 11pm and 5am on the next day for at least one year (Department of Transport and Main Roads, 2010d).

After holding a P1 licence for at least 12 consecutive months, novice drivers can progress to a P2 licence. In order to progress to the P2 licence young novice drivers must pass a hazard perception test. The hazard perception test is an online computer-based test which measures a driver's ability to anticipate and appropriately respond to potentially dangerous situations while driving (Department of Transport and Main Roads, 2010b).

A P2 licence, for young novice drivers, must be held for at least two years. P2 licensees have the following restrictions:

- Must display a green P-plate on the front and rear of the vehicle,
- Must comply with the no alcohol limit (0.00),
- Must not teach a learner licence holder to drive,
- Are not permitted to drive high powered vehicles.

Like P1 drivers, P2 drivers who accumulate four or more demerit points over a one year period will either:

- Have their licence suspended for three months with a one year late night driving restriction after the suspension or
- Enter into a good driving behaviour (GDB) agreement which also entails late night driving restriction.

(Department of Transport and Main Roads, 2010c).

After completing the required stages of a P2 licence, drivers automatically progress to an unrestricted ‘open’ licence.

2.4 Conclusions

As can be seen the Queensland GDL program differs to other Australian States with regards to:

- No speed restrictions (N.S.W, N.T. and Tasmania restrict the speed at which novice and learner drivers can travel),
- The amount of logged supervised driving hours and minimum duration that a learners licence must be held,
- Restrictions regarding towing trailers or other vehicles (NSW and Victoria place restrictions on P1 drivers),
- Passenger and night time driving restrictions, and

- Positioning of the practical examination in the licensing stages, (Western Australia conducts practical exam during two learners stages).

The question of course is have the GDL measures implemented in Queensland had any effect on reducing fatal and hospitalisation crashes for young novice drivers?

The following components of this study aim to answer this question.

3 Chapter 3: Methodology

The World Health Organisation (2010) stipulates that assessing the impact of any road safety program or intervention is vital to determine whether it works. The WHO further elaborates suggesting that evaluation can also:

- Help refine the program;
- Provide evidence to support the continuation of the program;
- Determine whether the program is appropriate for the target population;
- Determine if additional resources are required; and
- Identify any issues or concerns that may need to be addressed.

The World Health Organisation (2010) suggests several evaluation methods that have proven themselves in the past. One particular impact and outcome evaluation method they highlight is the '*controlled before and after study*'.

A '*controlled before and after study*' involves observing data pertaining to the identified goals of an intervention program in both the people who have received the intervention and those in a control group. Observation of data before the intervention and after the intervention is assessed to identify any marked differences that have resulted due to the intervention (WHO, 2010).

The Institute of Transportation Engineers (2009) provides further detail pertaining to before and after studies. They highlight that changes from the before and after period can be attributed to four components:

- Treatment effect: the change caused by the implementation of the specific treatment,
- Exposure effect: the change caused by changes in traffic volume and patterns of use,
- Trend effect: the change caused by casual factors that are not recognised, measured or understood, and
- Random effect: changes that occur because of a phenomenon referred to as regression to the mean bias.

A '*Before and After Study with Comparison Group*' is identified by the Institute of Transportation Engineers (2009) as a method that addresses three of the four components mentioned above; treatment effect, exposure effect and trend effect.

Data pertaining to a target group is compared against a comparison group from before implementation and after implementation of the treatment under investigation. This comparison group is used as a control group to identify any trends, separate to the treatment under investigation that may influence or be responsible for changes in the target group results.

A benefit of the '*Before and After Study with Comparison Group*' is that it does not require one to one correspondence between the comparison group and the group under investigation. Instead it draws on a larger comparison group that has some similarities to the targeted group (Institute of Transportation Engineers, 2009).

This study has conducted a '*Before and After Study with Comparison Group'* of young novice drivers (17-20) before and after the implementation of the new Queensland GDL program in July 2007. Data pertaining to fatal and hospitalisation crash rates has been accessed from the Department of Transport and Main Roads. The control group consists of Queensland drivers aged 25-69. It is acknowledged that the '*Before and After Study with Comparison Group*' does not address regression to the mean bias.

This paper has used '*accident contributing circumstances data*' contained within road crash records held by the Queensland Department of Transport and Main Roads. The contributing circumstances chosen relate to the young driver risk factors identified earlier and are identified in **Table 3.1**. The performance level or age of car driven has not been reviewed as the Queensland Department of Transport and Main Roads hold limited data that identifies these particulars for vehicles involved in crashes.

Table 3. 1: Risk factors and Contributing Circumstances

Identified Risk Factor	Contributing Circumstance listed in Main Roads Database
Inexperience	Rain/Wet Road and Inexperience
Less developed visual perception and cognitive skills	Age (lack of perception) and Fail To Give-Way / Stop
Deliberate risk taking	Speed Related and Negligence
Inability to identify risks or hazards	Undue Care and Attention and Illegal Traffic Manoeuvre
Overconfidence	Dangerous Driving
Inattention / distraction	Inattention and Distraction
Tendency to drive at high risk times	Crashes between hours of 6pm and 6am
Alcohol or drugs	Alcohol Related and Drug related

At the time of writing this paper fatal crash data had been finalised for 2009 however hospitalisation data had only been finalised up to 30th September 2009 with preliminary data being reported up to 2011. The Department of Transport and Main Roads state this is due to the time it takes for police to complete crash investigations, finalise reports, and collect additional information from other sources such as the coroner, pathologist and government medical laboratory.

Additionally the Department of Transport and Main Roads acknowledge that the implementation of new systems in 2006 affected data recording from July 2006 to June 2007.

To account for these issues this study will analyse fatal and hospitalisation crash data before the implementation of the new Queensland GDL program from January 1st 2002 to December 31st 2005. Fatal and hospitalisation data from January 1st 2008 to December 31st 2009 will be analysed to determine any potential benefits after implementation of the new Queensland GDL program, however it is acknowledged that the 2009 hospitalisation data is indicative only as it has not been finalised and therefore cannot be used to develop definitive conclusions.

Potential differences resulting from population growth will be addressed by calculating percentages of licence holders for the targeted age group and control group for each year.

The number of accidents attributed to an identified contributing circumstance in a given year will be divided by the total number of licensed drivers for the identified age group in the same year and then multiplied by 100.

% of licence holders = (accidents attributed / number of licence drivers for age group) x 100

4 Chapter 4: Data Analysis

Web Crash data provides four classifications for the severity of injuries resulting from traffic crashes. The classifications are:

- fatality,
- hospitalisation,
- medically treated, and
- minor injury.

This analysis will be conducted on fatal and hospitalisation casualties only.

Fatal crash data contained within this paper has been finalised for 2009 however hospitalisation data has only been finalised up to 30th September 2009 with preliminary data being reported up to 2011. Therefore 2009 data reported for hospitalisation rates is indicative only and cannot be used to develop definitive conclusions.

The number of licenced drivers from 2002 to 2005 and 2008 to 2009 can be found in Appendix A. This data has been used to convert crash numbers to percentages in order to allow comparisons to be made from year to year.

Data has been listed under the identified risk factor and associated contributing circumstance.

4.1 Risk Factor: Inexperience

4.1.1 Contributing Circumstance: Rain/ Wet Road

Data pertaining to fatal crashes attributed to rain/wet road conditions is displayed in Graph 4.1 to 4.4 and Table 4.1 and 4.2.

Table 4. 1: Fatal crashes: Rain /wet road

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	3	170,407	0.002	4	1,952,038	0.0002
2003	2	169,987	0.001	10	2,007,546	0.0005
2004	4	167,117	0.002	10	2,052,151	0.0005
2005	3	168,247	0.002	22	2,100,795	0.0010
2008	4	187,393	0.002	16	2,312,086	0.0007
2009	2	199,173	0.001	16	2,388,047	0.0007

Graph 4. 1

Graph 4. 2

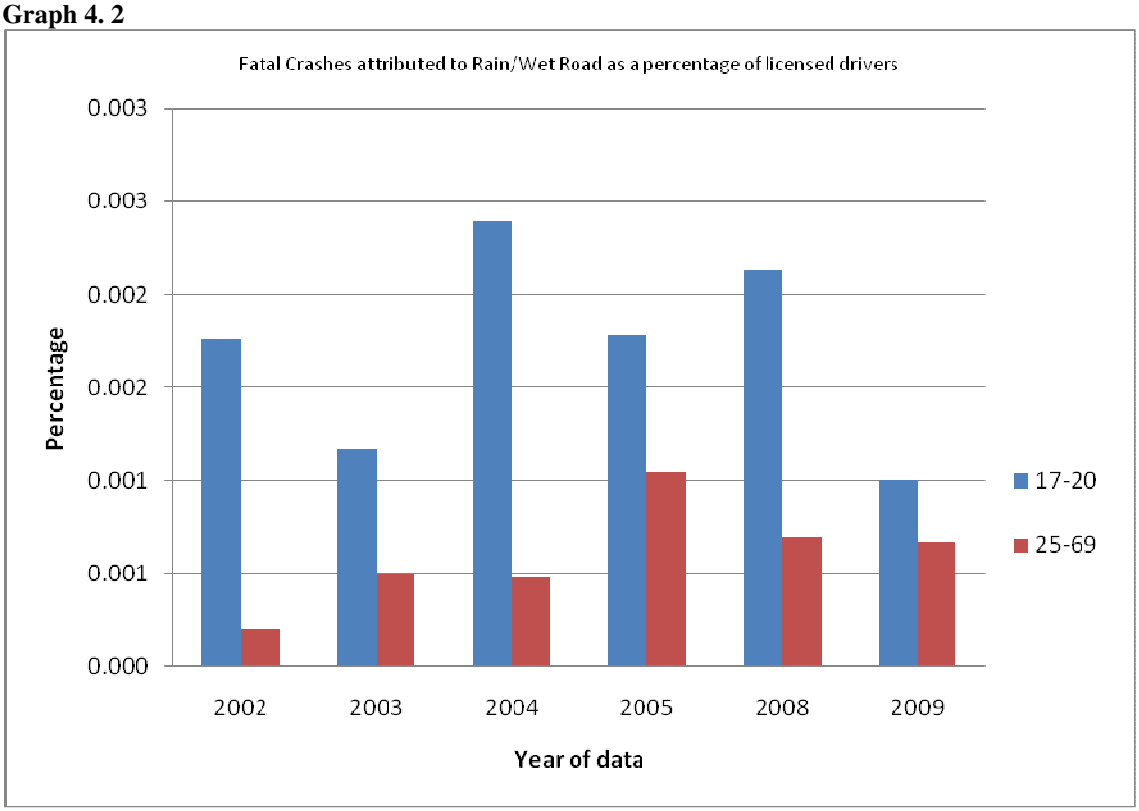
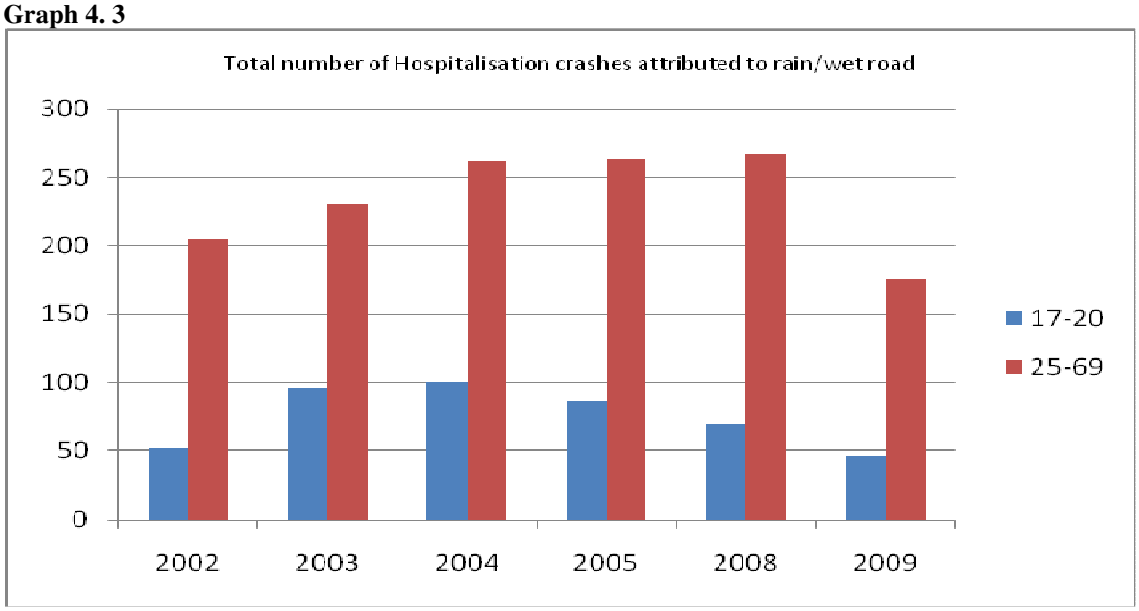


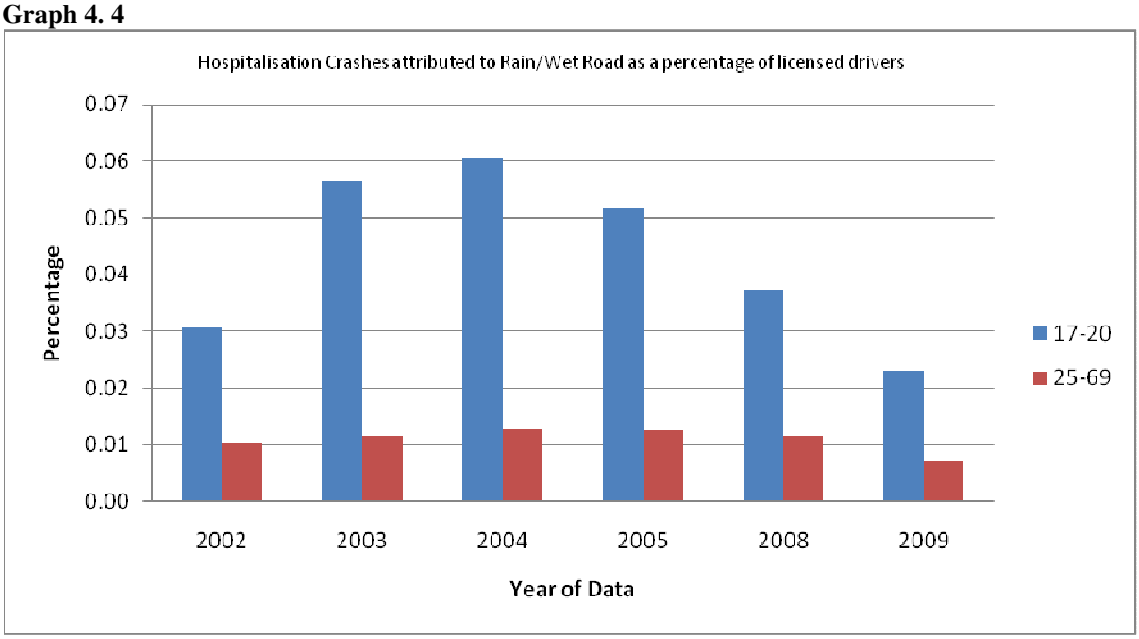
Table 4. 2: Hospitalisation crashes: Rain /wet road

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	52	170,407	0.031	205	1,952,038	0.011
2003	96	169,987	0.056	231	2,007,546	0.012
2004	101	167,117	0.060	262	2,052,151	0.013
2005	87	168,247	0.052	264	2,100,795	0.013
2008	70	187,393	0.037	267	2,312,086	0.012
2009	46	199,173	0.023	176	2,388,047	0.007

Graph 4. 3



Graph 4. 4



Fatal crashes attributed to rain/wet road have fluctuated between four fatalities and two fatalities per year before and after the introduction of the new GDL program. Falatities, as a percentage of total licensed drivers aged 17-20 years did reduce in 2009 however they increased in 2008.

These increases and decreases are by only one to two fatalities per year and hence it can be concluded that these increases and decreases are the result of the random nature of traffic crashes and not a result of the new GDL program (see graph 4.1 and 4.2).

Hospitalisation rates attributed to rain/wet road for 17 to 25 year olds has trended downwards since 2004 for both the number of hospitalisation crashes and as a percentage of licensed drivers (see graph 4.3 and 4.4). While the same trend is not shown in the comparision group of drivers aged 25-69 years, the comparison group did record a small reduction in hospitalisation crashes as a percentage of licensed drivers in 2008.

As the downward trend for 17 to 20 year olds commenced before the implementation of the new GDL program and the comparison group also recorded a reduction in hospitalisation crashes after the implementation of the new GDL it cannot be concluded that the reduction in hospitalisation crashes for 17 to 20 year olds is a result of the new GDL program.

As mentioned earlier, 2009 hospitalisation results have only been finalised until 30th September 2009 and hence 2009 results are displayed for indicative comparision only. No conclusions have been drawn from 2009 hospitalisation rates for crashes attributed to rain/wet road.

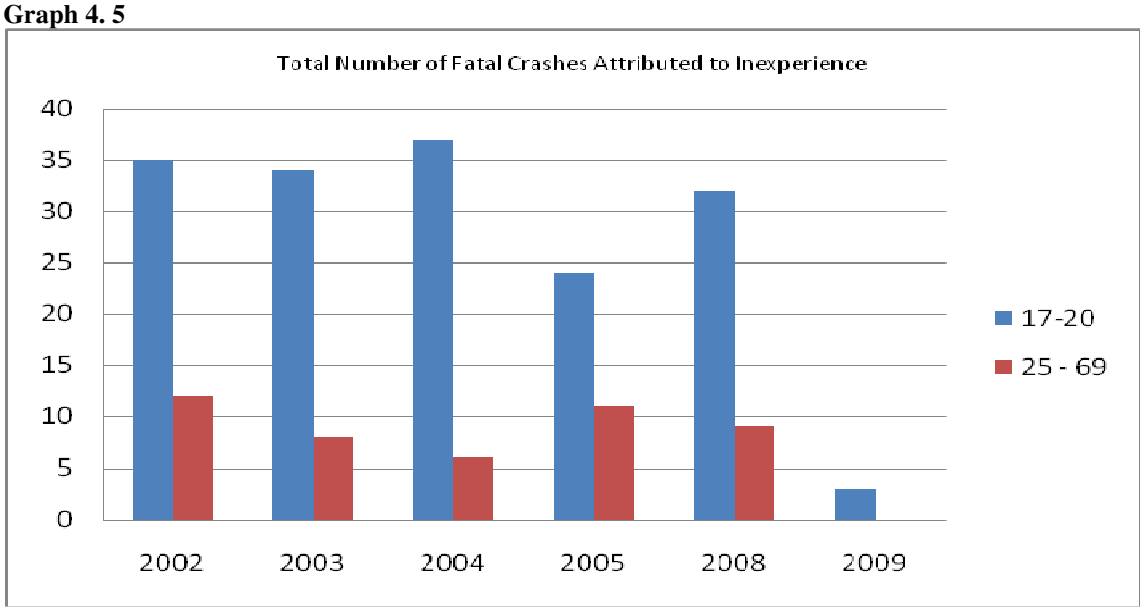
4.1.2 Contributing Circumstance: Inexperience

Data pertaining to crashes attributed to inexperience is displayed in Graph 4.5 to 4.8 and Table 4.3 and 4.4.

Table 4. 3: Fatal crashes: Inexperience

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	35	170,407	0.0205	12	1,952,038	0.0006
2003	34	169,987	0.0200	8	2,007,546	0.0004
2004	37	167,117	0.0221	6	2,052,151	0.0003
2005	24	168,247	0.0143	11	2,100,795	0.0005
2008	32	187,393	0.0171	9	2,312,086	0.0004
2009	3	199,173	0.0015	0	2,388,047	0.0000

Graph 4. 5



Graph 4. 6

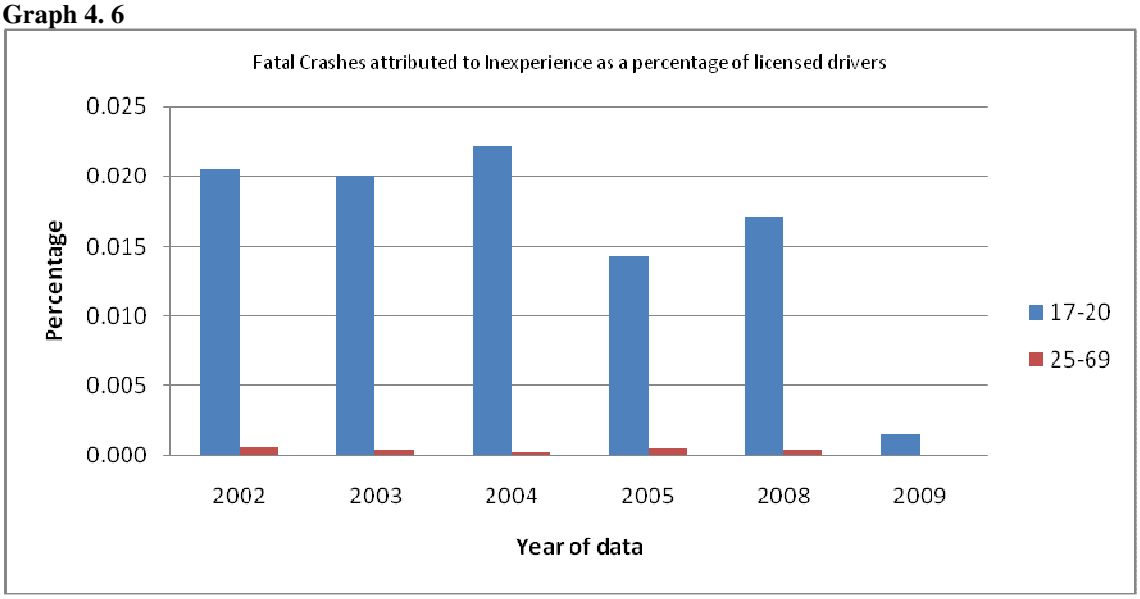
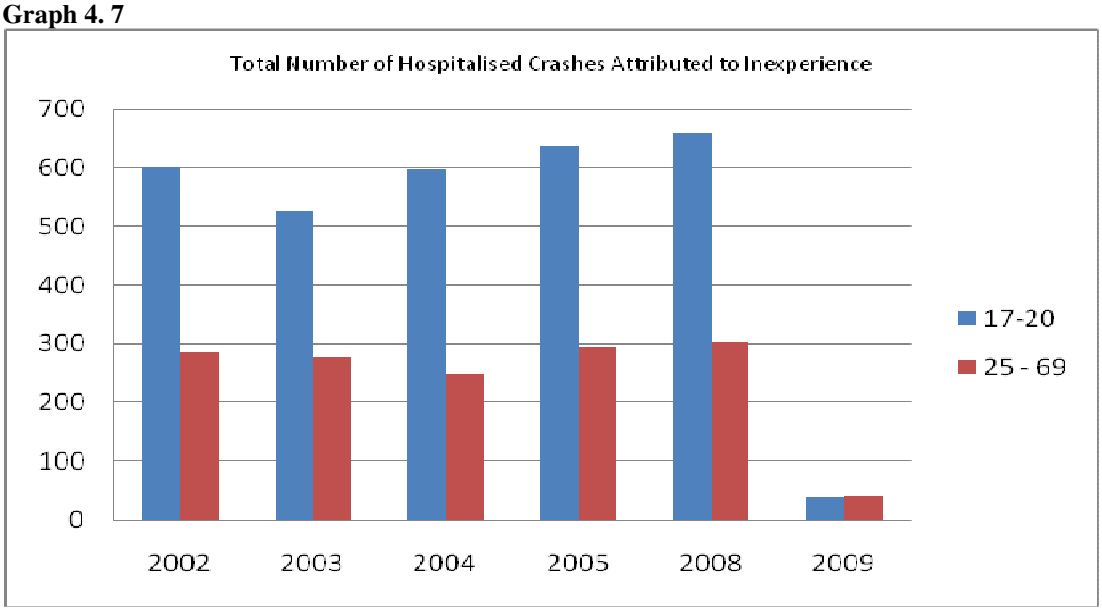


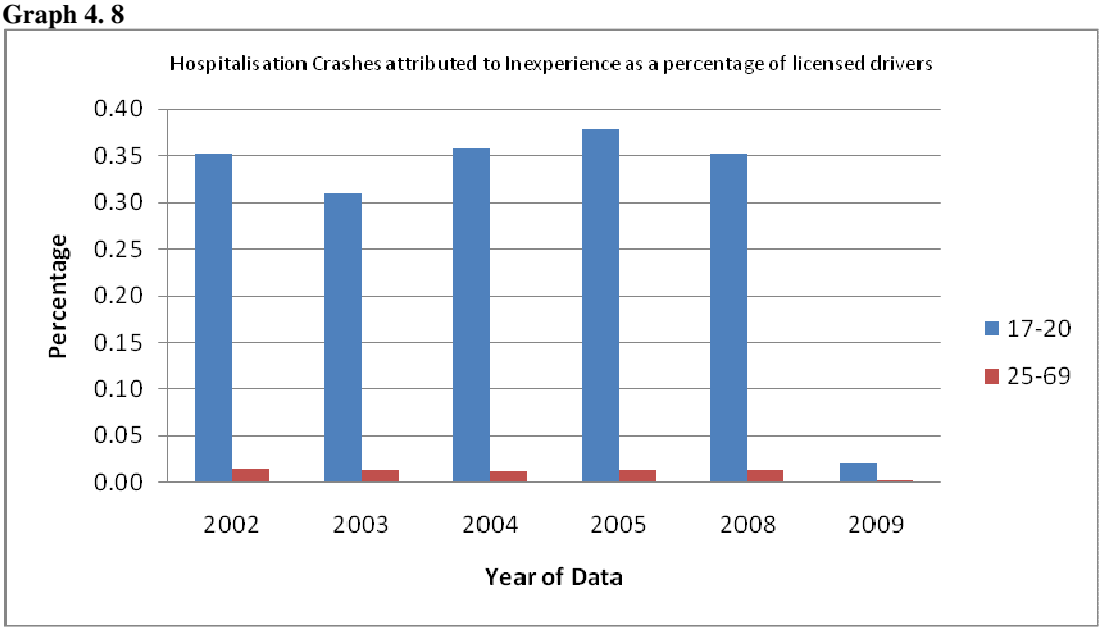
Table 4. 4: Hospitalisation crashes: Inexperience

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	601	170,407	0.35	285	1,952,038	0.015
2003	526	169,987	0.31	276	2,007,546	0.014
2004	597	167,117	0.36	248	2,052,151	0.012
2005	636	168,247	0.38	294	2,100,795	0.014
2008	660	187,393	0.35	302	2,312,086	0.013
2009	41	199,173	0.02	43	2,388,047	0.002

Graph 4. 7



Graph 4. 8



Fatal crashes attributed to inexperience drastically reduced in 2009. This reduction resulted in the average number of fatalities attributed to inexperience reducing from 32.5 pre GDL to 17.5 post GDL. It must however also be noted that fatalities for the comparison group of 25-69 year old drivers also reduced from a pre GDL average of 9.25 to 2.25 and that 2009 recorded no fatalities attributed to inexperience for the comparison group (see graph 4.5 and 4.6).

A failing of a before and after study with comparison group is that it cannot determine the effectiveness of a treatment if crash counts in either the before or after period in the comparison group equal zero (Institute of Transportation Engineers, 2009). Therefore while the preliminary data indicates that there has had a dramatic reduction in fatalities attributed to inexperience for young drivers there is insufficent evidence to conclude that the GDL program is solely responsible for this.

While the number of hospitalisation crashes for 17 to 20 year olds increased in 2008, an increase of 3.6% from the 2005 total, they actually reduced as a percentage of licenced drivers, reducing by 7.3% from the 2005 total (see graph 4.7 and 4.8).

This trend however was also mirrored by the comparison group. The number of hospitalisation crashes in 2008 for the comparison group increased by 2.65% from the 2005 total however as a percentage of licensed drivers the 2008 total reduced by 7.14% from the 2005 total.

As these trends are so similar any reduction in the target group cannot be attributed to the new GDL program.

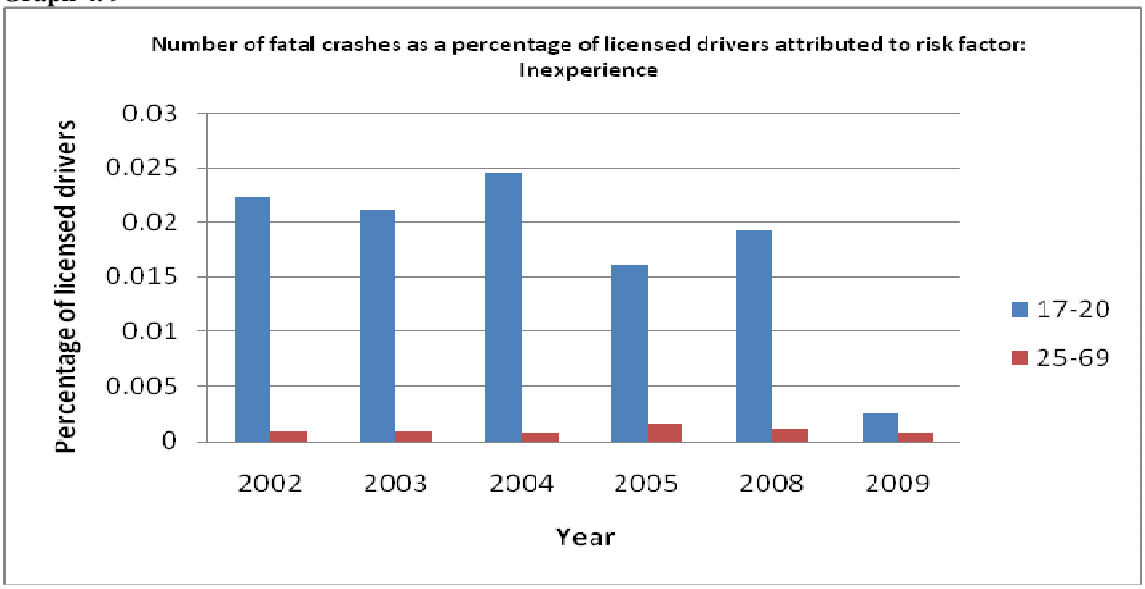
4.1.3 Discussion for Risk Factor: Inexperience

Data for the contributing circumstances rain / wet road and inexperience has been combined to determine the overall impact the new GDL program has had on addressing the risk factor inexperience. This data is contained in Table 4.5 and 4.6 and in Graph 4.9 and 4.10.

Table 4. 5: Fatal crashes: Risk factor - Inexperience

Number of Fatal Crashes (Risk Factor: Inexperience)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	38	170,407	0.0223	16	1,952,038	0.0008
2003	36	169,987	0.0212	18	2,007,546	0.0009
2004	41	167,117	0.0245	16	2,052,151	0.0008
2005	27	168,247	0.0160	33	2,100,795	0.0016
2008	36	187,393	0.0192	25	2,312,086	0.0011
2009	5	199,173	0.0025	16	2,388,047	0.0007

Graph 4. 9



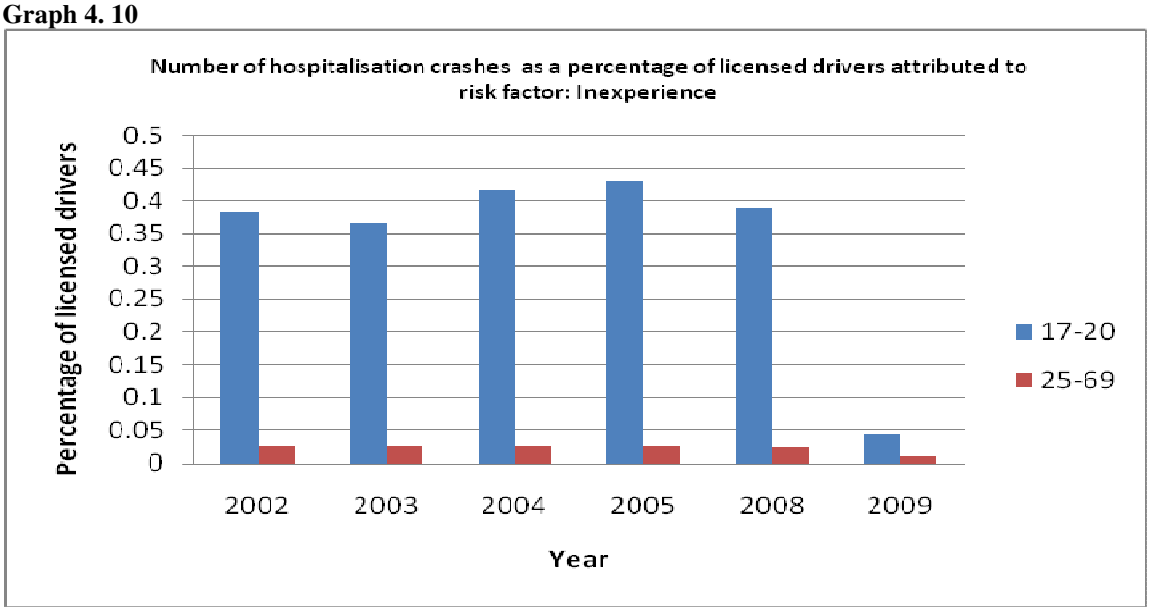
Fatalities attributed to the risk factor inexperience drastically reduced in 2009 for both 17 to 20 year olds and the comparison group. However this was not the case in 2008. In 2008 there was an increase in the number of fatalities recorded for 17 to 20 year olds from the 2005 total. In contrast the comparison group has recorded a declining trend since 2005.

While the drastic reduction in 2009 for 17 to 20 year olds is positive there is insufficient evidence at this point in time to attribute this reduction solely to the new GDL program.

Table 4. 6: Hospitalisation crashes: Risk factor - Inexperience

Number of Hospitalised Crashes (Risk Factor: Inexperience)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	653	170,407	0.383	490	1,952,038	0.025
2003	622	169,987	0.366	507	2,007,546	0.025
2004	698	167,117	0.418	510	2,052,151	0.025
2005	723	168,247	0.430	558	2,100,795	0.027
2008	730	187,393	0.390	569	2,312,086	0.025
2009	87	199,173	0.044	219	2,388,047	0.009

Graph 4. 10



Unlike fatalities, hospitalisation crashes as a percentage of licensed drivers reduced in 2008 for 17 to 20 year olds by 10.3% from the 2005 total. The comparison group also experienced a reduction in hospitalisation crashes for the same period, reducing by 7.9%.

The reductions are very similar and therefore cannot be attributed to the new GDL program.

4.2 Risk Factor: Less Developed Visual Perception and Cognitive Skills

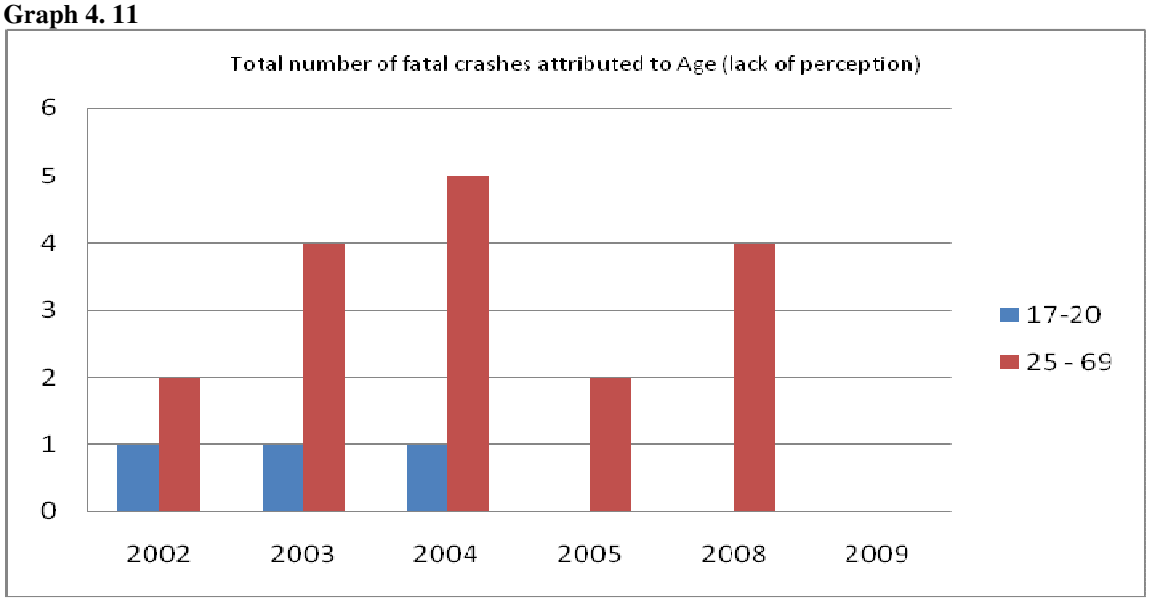
4.2.1 Contributing Circumstance: Age (Lack of Perception)

Data pertaining to crashes attributed to age (lack of perception) is displayed in Graph 4.11 to 4.14 and Table 4.7 and 4.8.

Table 4. 7: Fatal crashes: Age (lack of perception)

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	1	170,407	0.0006	2	1,952,038	0.0001
2003	1	169,987	0.0006	4	2,007,546	0.0002
2004	1	167,117	0.0006	5	2,052,151	0.0002
2005	0	168,247	0.0000	2	2,100,795	0.0001
2008	0	187,393	0.0000	4	2,312,086	0.0002
2009	0	199,173	0.0000	0	2,388,047	0.0000

Graph 4. 11



Graph 4. 12

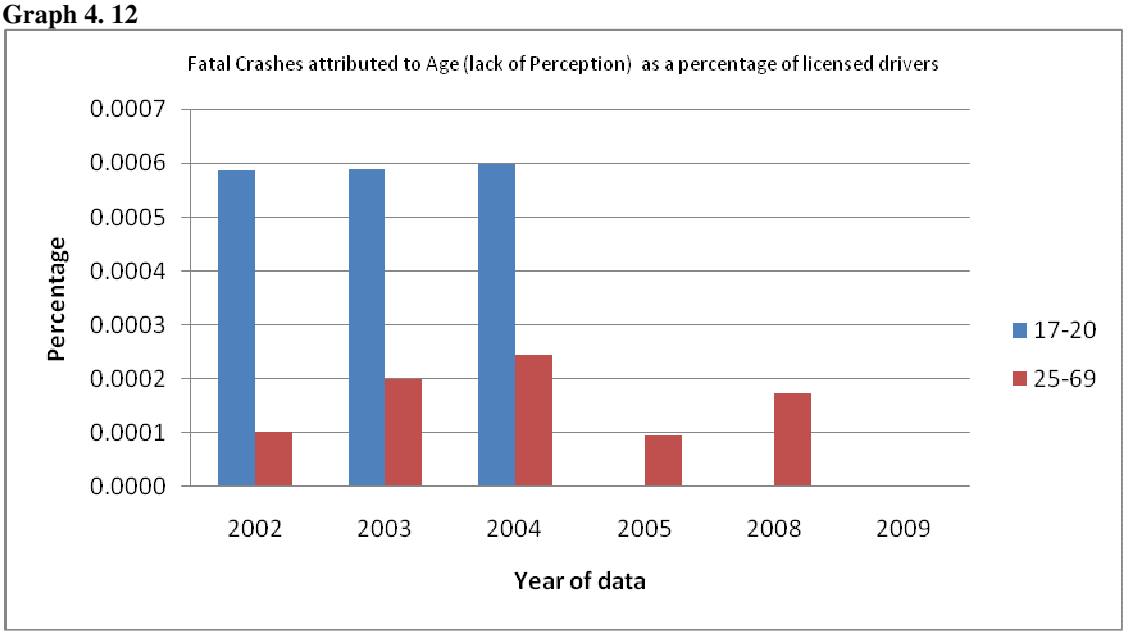
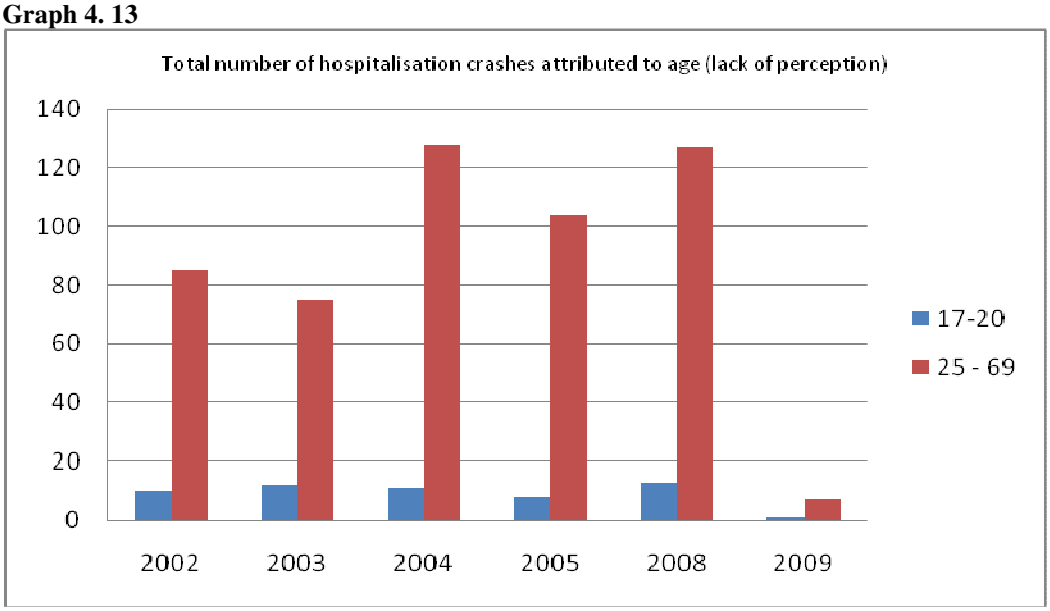


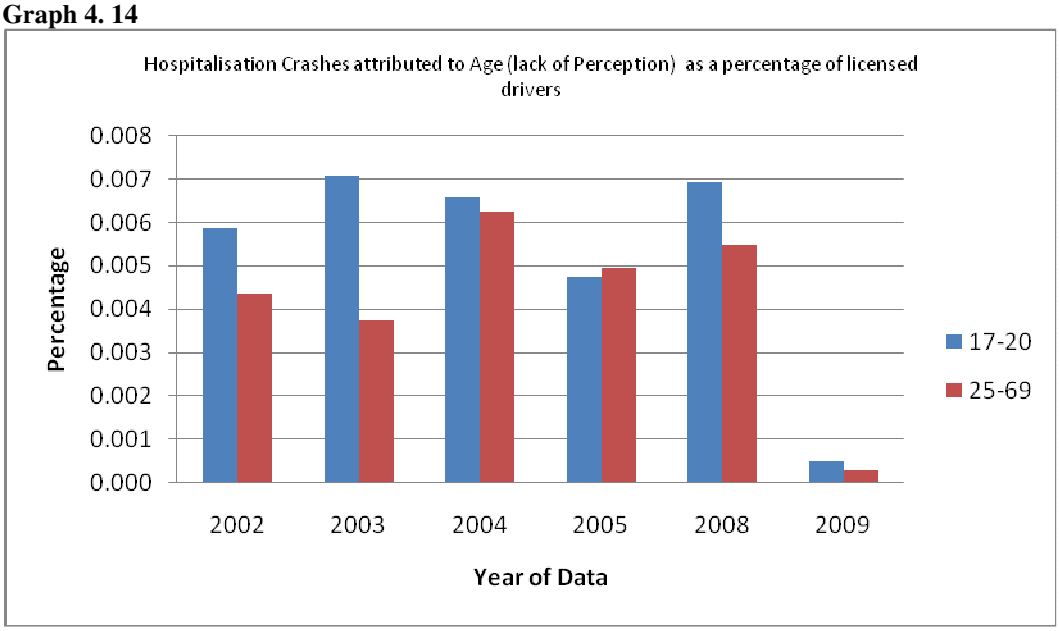
Table 4. 8: Hospitalisation crashes: Age (lack of perception)

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	10	170,407	0.006	85	1,952,038	0.004
2003	12	169,987	0.007	75	2,007,546	0.004
2004	11	167,117	0.007	128	2,052,151	0.006
2005	8	168,247	0.005	104	2,100,795	0.005
2008	13	187,393	0.007	127	2,312,086	0.005
2009	1	199,173	0.001	7	2,388,047	0.000

Graph 4. 13



Graph 4. 14



Very few fatal crashes have been attributed to age (lack of perception) for drivers aged 17-20 years. Additionally zero fatalities were recorded for both the comparison group (25-69 year old) and the target group for 2009 (see graph 4.9 and 4.10).

As mentioned earlier a failing of a before and after study with comparison group is that the effectiveness of the treatment cannot be determined if crash counts for the comparison group before or after the treatment equal zero (Institute of Transportation Engineers, 2009).

Consequently there is insufficient evidence to develop any conclusions regarding the effectiveness of the new GDL program in addressing young driver fatalities attributed to age (lack of perception).

The number of hospitalisation crashes attributed to age (lack of perception) for 17 to 20 year old drivers increased in 2008 by 38.46% (31.46% as a percentage of licensed drivers) from the 2005 total. This increase defied a decreasing trend prior to the implementation of the new GDL program. The comparison group of 25 to 69 year old drivers however also increased in 2008 (see graph 4.11 and 4.12). The number of hospitalisation crashes in 2008 for the comparison group increased by 18.1% (9.87% as a percentage of licensed drivers) from the 2005 total.

The data available for 2009 indicates there has been a dramatic reduction in hospitalisation rates for both the comparison group and young drivers however as the entire year of data for 2009 has not been finalised no conclusions at this point in time can be made.

The available data indicates the new GDL program has had no impact on addressing hospitalisation crashes attributed to age (lack of perception).

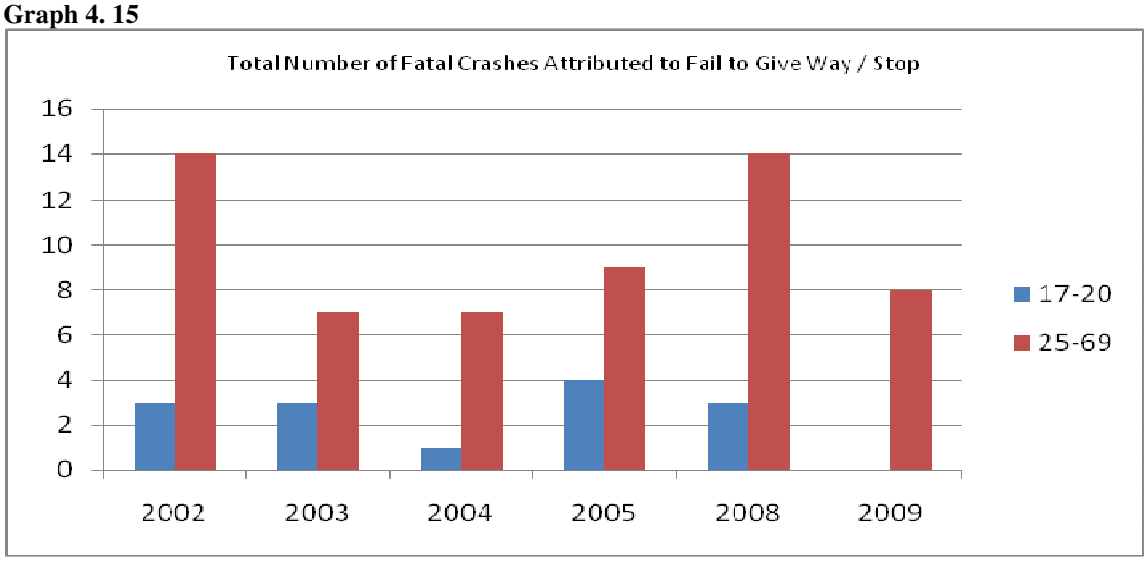
4.2.2 Contributing Circumstance: Failure to Give-way or Stop

Data pertaining to crashes resulting from failure to give way or stop is displayed in Graph 4.15 to 4.18 and table 4.9 and 4.10.

Table 4. 9: Fatal crashes: Fail to give-way / stop

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	3	170,407	0.0018	14	1,952,038	0.0007
2003	3	169,987	0.0018	7	2,007,546	0.0003
2004	1	167,117	0.0006	7	2,052,151	0.0003
2005	4	168,247	0.0024	9	2,100,795	0.0004
2008	3	187,393	0.0016	14	2,312,086	0.0006
2009	0	199,173	0.0000	8	2,388,047	0.0003

Graph 4. 15



Graph 4. 16

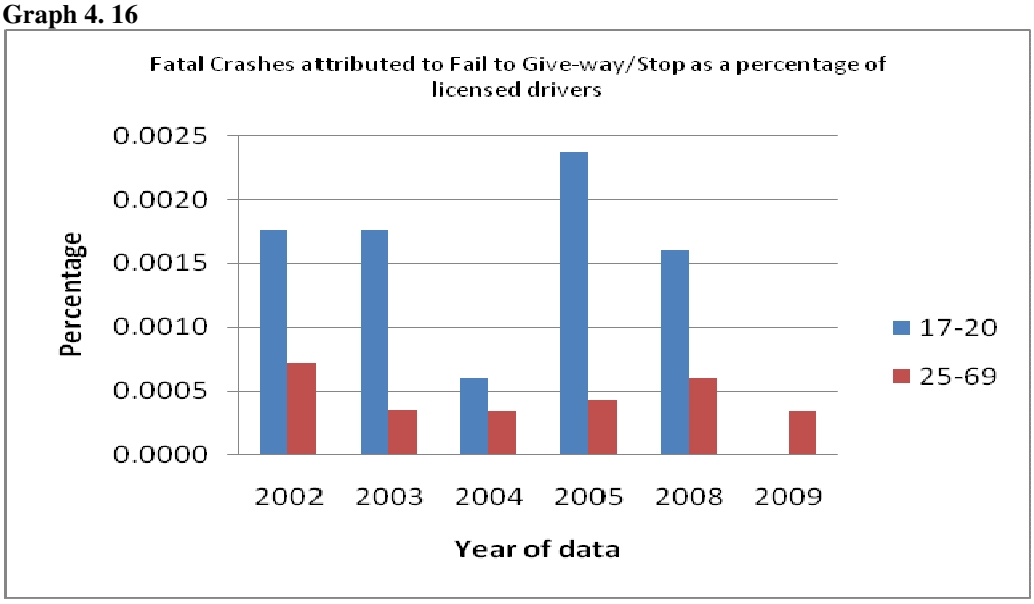
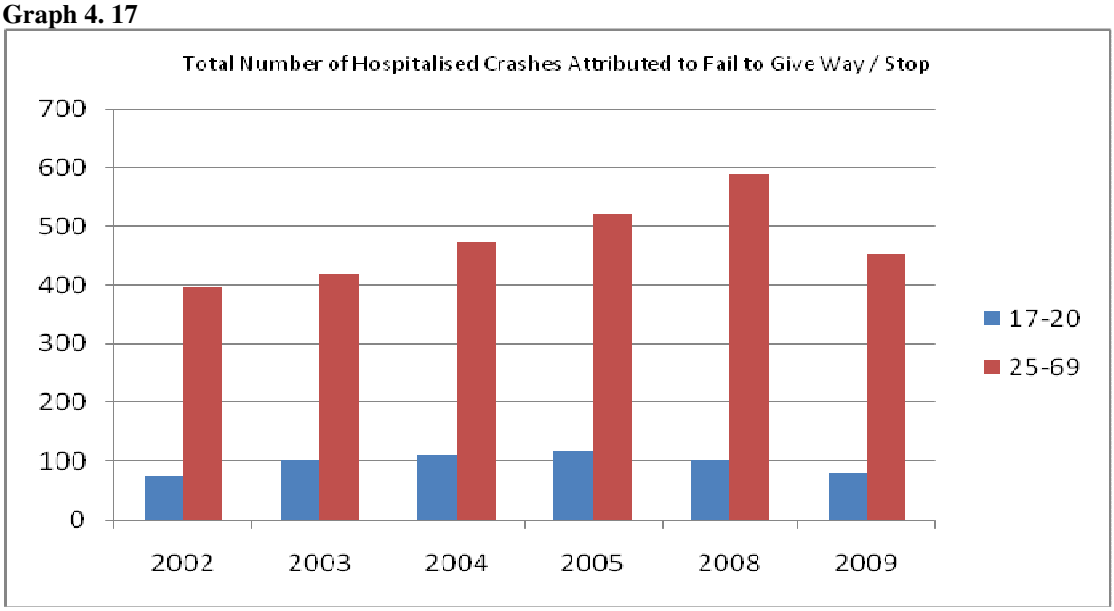


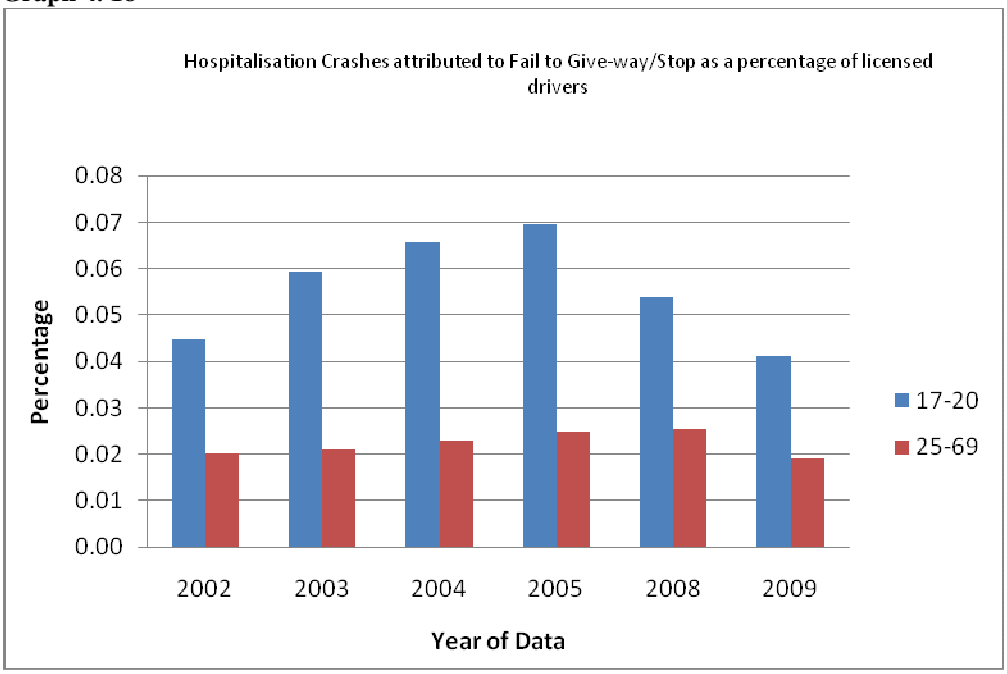
Table 4. 10: Hospitalisation crashes: Fail to give-way / stop

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	76	170,407	0.045	396	1,952,038	0.020
2003	101	169,987	0.059	419	2,007,546	0.021
2004	110	167,117	0.066	472	2,052,151	0.023
2005	117	168,247	0.070	521	2,100,795	0.025
2008	101	187,393	0.054	589	2,312,086	0.025
2009	82	199,173	0.041	453	2,388,047	0.019

Graph 4. 17



Graph 4. 18



Fatalities attributed to fail to give way / stop for 17 – 20 year old drivers have reduced since the introduction of the new GDL program. In contrast fatalities attributed to fail to give way / stop increased for the comparison group in 2008. While these results are pleasing, due to the low number of fatalities this decrease could be attributed to the random nature of crashes as opposed to any treatment and therefore no definitive conclusion can be reached at this point in time (see graph 4.15, 4.16 and table 4.9).

Hospitalisation rates attributed to fail to give way / stop were adhering to an upward trend prior to the implementation of the new GDL program for both the comparison group and target group. Data for 2008 however indicates this trend has been corrected for 17 to 20 year olds. The number of hospitalisation crashes for 17 to 20 year olds reduced by 15.84% from the 2005 peak; as a percentage of licensed drivers this reduction was 29%. In contrast the number of hospitalisation crashes for the comparison group increased by 11.5%; 2.65% as a percentage of licensed drivers (see graph 4.17 and 4.18).

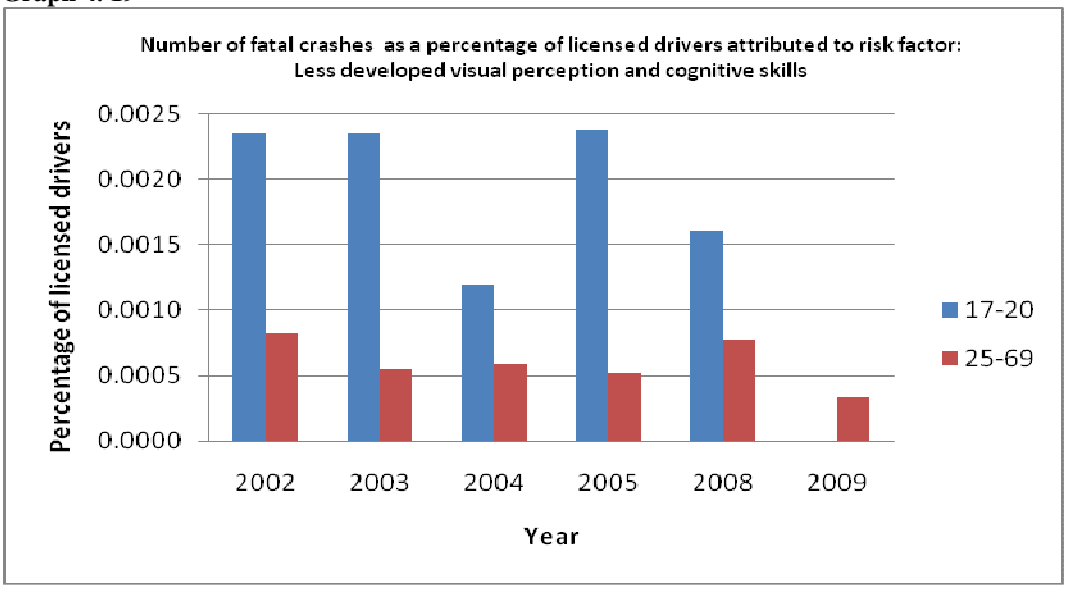
4.2.3 Discussion for Risk Factor: Less Developed Visual Perception and Cognitive Skills

Data for the contributing circumstances age (lack of perception) and fail to give way / stop has been combined to determine the overall impact the new GDL program has had on addressing the risk factor 'less developed visual perception and cognitive skills'. This data is contained in Table 4.11 and 4.12 and in Graph 4.19 and 4.20.

Table 4. 11: Fatal crashes: Risk factor – Less developed visual perception and cognitive skills

Number of Fatal Crashes (Risk Factor: Less Developed Visual Perception and Cognitive Skills)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	4	170,407	0.0023	16	1,952,038	0.0008
2003	4	169,987	0.0024	11	2,007,546	0.0005
2004	2	167,117	0.0012	12	2,052,151	0.0006
2005	4	168,247	0.0024	11	2,100,795	0.0005
2008	3	187,393	0.0016	18	2,312,086	0.0008
2009	0	199,173	0.0000	8	2,388,047	0.0003

Graph 4. 19

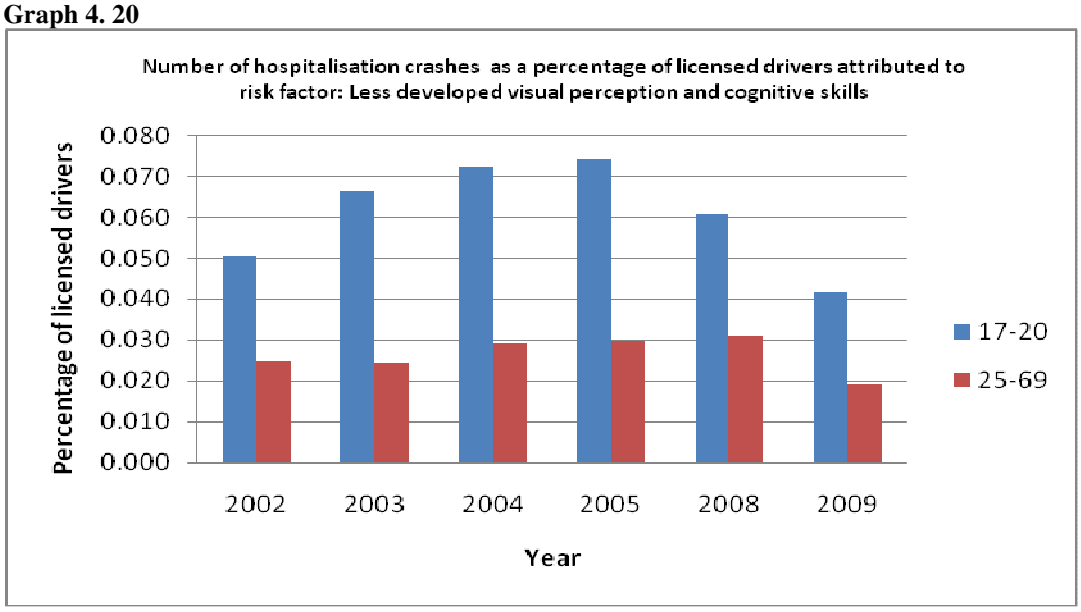


In 2008, fatalities attributed to less developed visual perception and cognitive skills reduced as a percentage of licensed drivers from the 2005 peak for 17 to 20 year old drivers by 48.5% while in the same period the comparison group increase by 32.7% . The number of fatalities further reduced to zero in 2009 for 17 to 20 year old drivers. These results are positive however when one looks at the actual number of fatal crashes it is evident these dramatic changes are a result of only one or two fatalities, (Table 4.11). Due to the very low number of fatalities the changes can be attributed to the randomness of crashes and not to the introduction of the new GDL program.

Table 4. 12: Hospitalisation crashes: Risk factor – Less developed visual perception and cognitive skills

Number of Hospitalised Crashes (Risk Factor: Less Developed Visual Perception and Cognitive Skills)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	86	170,407	0.050	481	1,952,038	0.025
2003	113	169,987	0.066	494	2,007,546	0.025
2004	121	167,117	0.072	600	2,052,151	0.029
2005	125	168,247	0.074	625	2,100,795	0.030
2008	114	187,393	0.061	716	2,312,086	0.031
2009	83	199,173	0.042	460	2,388,047	0.019

Graph 4. 20



Preliminary data indicates the new GDL program has had an impact on hospitalisation crashes for 17 to 20 year old drivers, attributed to the risk factor of 'less developed visual perception and cognitive skills'. Prior to the introduction of the new GDL program, hospitalisation crashes attributed to 'less developed visual perception and cognitive skills' were adhering to an upward trend. This upward trend was reversed in 2008 for 17 to 20 year olds after the implementation of the new GDL program while in the same period the number of hospitalisation crashes continued to increase for the comparison group.

As a percentage of licensed drivers a 22.1% reduction in hospitalisation crashes was recorded in 2008 from the 2005 peak for 17 to 20 year old drivers. In contrast hospitalisation crashes for the comparison group increased by 3.9% as a percentage of licensed drivers in the same period.

4.3 Risk Factor: Deliberate Risk Taking

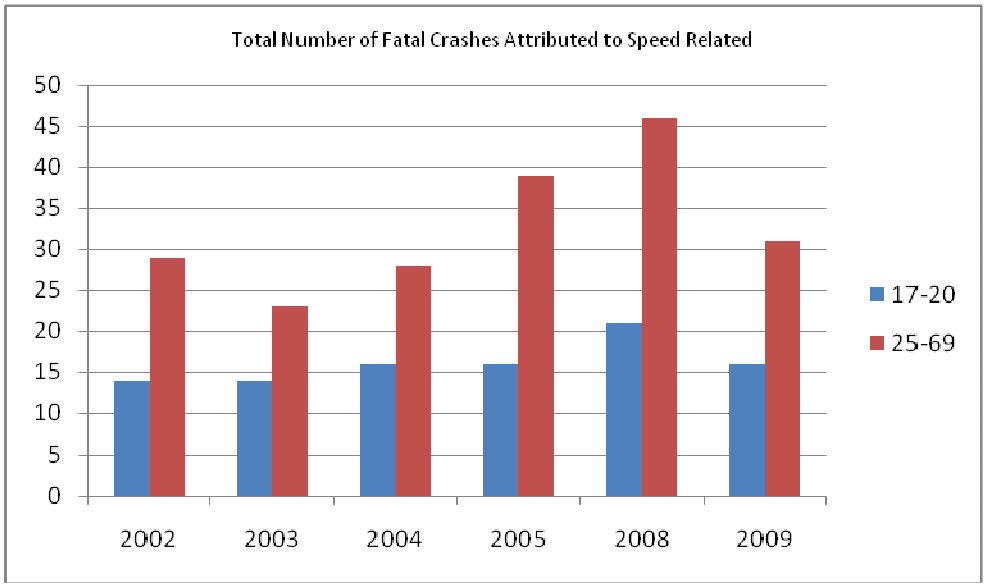
4.3.1 Contributing Circumstance: Speed Related

Data pertaining to crashes attributed to speed is displayed in Graph 4.21 to 4.24 and Table 4.13 and 4.14.

Table 4. 13: Fatal crashes: Speed related

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	14	170,407	0.008	29	1,952,038	0.001
2003	14	169,987	0.008	23	2,007,546	0.001
2004	16	167,117	0.010	28	2,052,151	0.001
2005	16	168,247	0.010	39	2,100,795	0.002
2008	21	187,393	0.011	46	2,312,086	0.002
2009	16	199,173	0.008	31	2,388,047	0.001

Graph 4. 21



Graph 4. 22

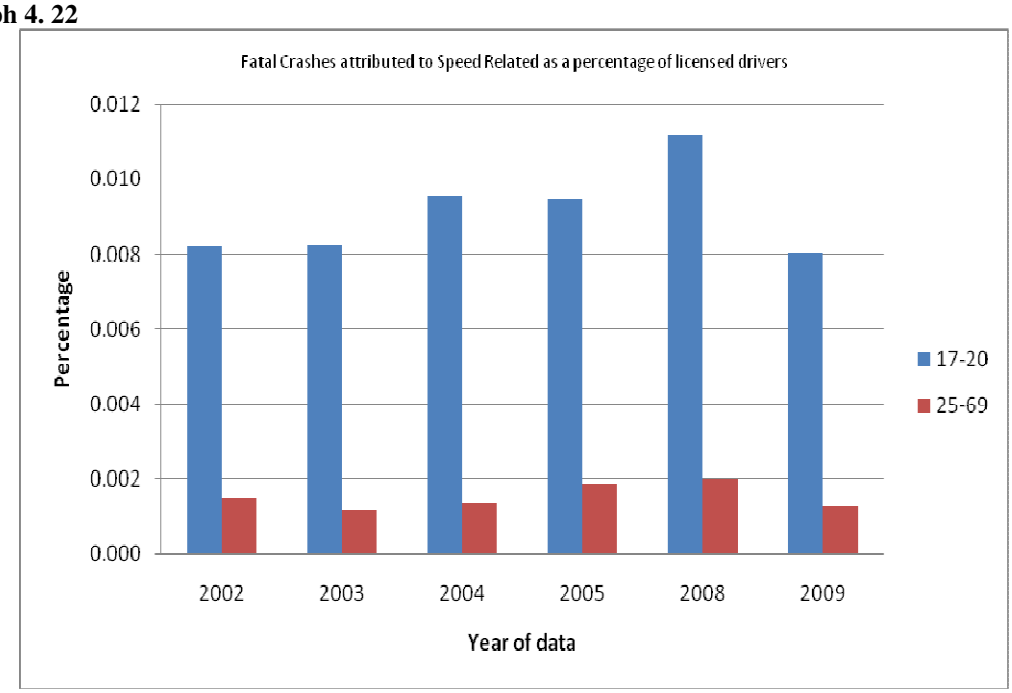
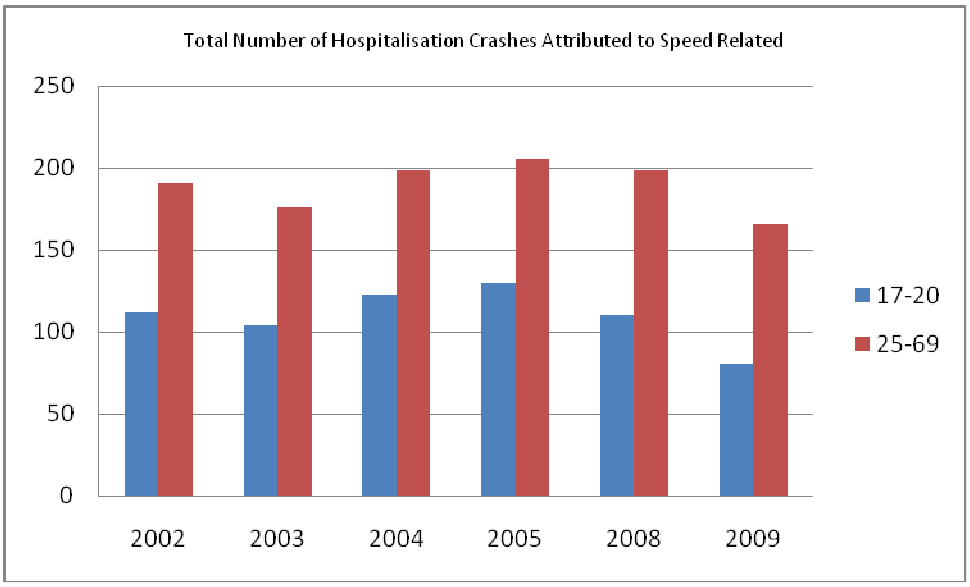


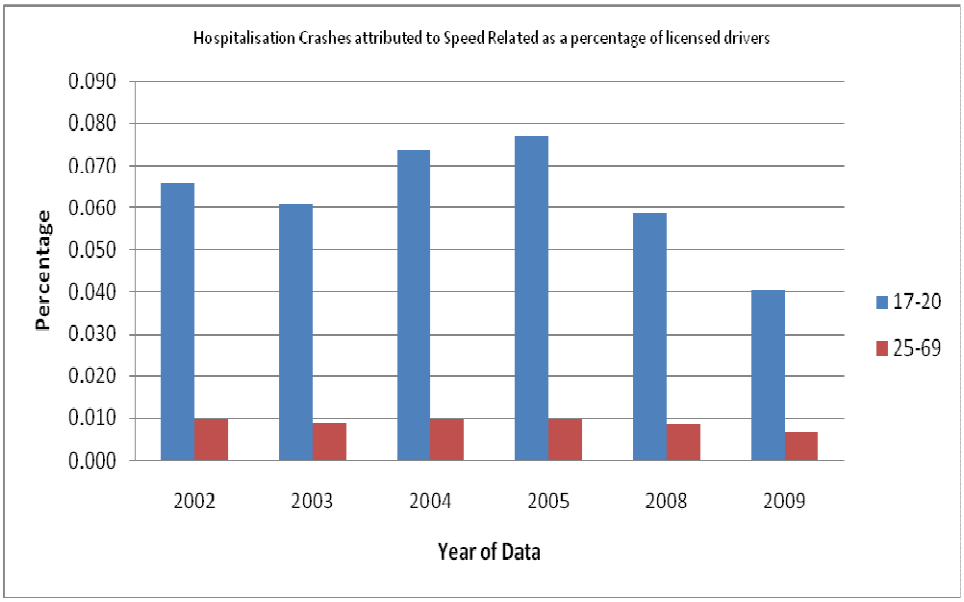
Table 4. 14: Hospitalisation crashes: Speed related

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	112	170,407	0.066	191	1,952,038	0.010
2003	104	169,987	0.061	176	2,007,546	0.009
2004	123	167,117	0.074	199	2,052,151	0.010
2005	130	168,247	0.077	206	2,100,795	0.010
2008	110	187,393	0.059	199	2,312,086	0.009
2009	81	199,173	0.041	166	2,388,047	0.007

Graph 4. 23



Graph 4. 24



Fatalities attributed to speed related crashes reduced in 2009 for both the comparison group and the target group. However fatalities for both the target group and comparison group increase in 2008, both in the number of fatalities and as a percentage of licensed drivers (see graph 4.21 and 4.22). The number of fatalities for 17 to 20 year olds increased by 23.8% from the 2005 total, while the number of fatalities for the comparison group increased by 15.2% from the 2005 total.

Prior to the implementation of the new GDL program, fatalities attributed to speed related crashes were trending upward and the 2008 data adheres to this trend. While the 2009 results indicate a reduction in the number of fatalities attributed to speed related crashes for both the target and comparison group, there is insufficient evidence to attribute this reduction to the new GDL program.

Hospitalisation rates for 17 to 20 year old drivers attributed to speed related crashes trended upward prior to the implementation of the new GDL program. Post GDL implementation the number of 17 to 20 year olds hospitalised due to speed related crashes reduced by 18.2% from the 2005 peak. As a percentage of licensed drivers this reduction is 31.6% from the 2005 peak. The comparison group also experienced a reduction in hospitalisation crashes but not as significant as the target group. The number of hospitalisation crashes for the comparison group reduced by 3.5% from the 2005 peak. As a percentage of licensed drivers the reduction from the 2005 peak is 13.9%.

The dramatic reduction in hospitalisation crashes for 17 to 20 year olds since the implementation of the new GDL program is positive however as the comparison group also experienced reductions in hospitalisation crashes the decrease cannot be solely attributed to the new GDL program.

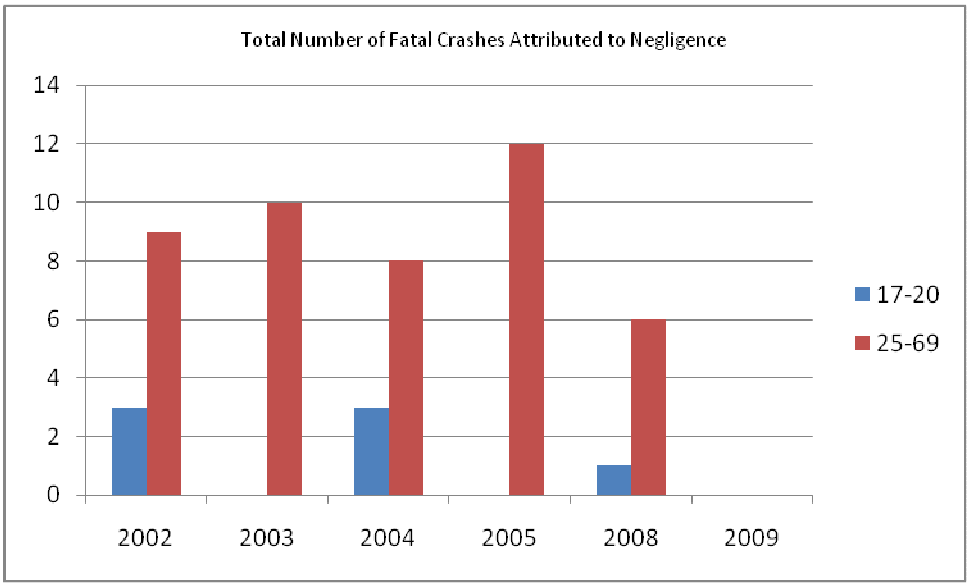
4.3.2 Contributing Circumstance: Negligence

Data pertaining to accidents attributed to negligence is displayed in Graph 4.21 to 4.24 and Table 4.25 and 4.28.

Table 4. 15: Fatal crashes: Negligence

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	3	170,407	0.0018	9	1,952,038	0.0005
2003	0	169,987	0.0000	10	2,007,546	0.0005
2004	3	167,117	0.0018	8	2,052,151	0.0004
2005	0	168,247	0.0000	12	2,100,795	0.0006
2008	1	187,393	0.0005	6	2,312,086	0.0003
2009	0	199,173	0.0000	0	2,388,047	0.0000

Graph 4. 25



Graph 4. 26

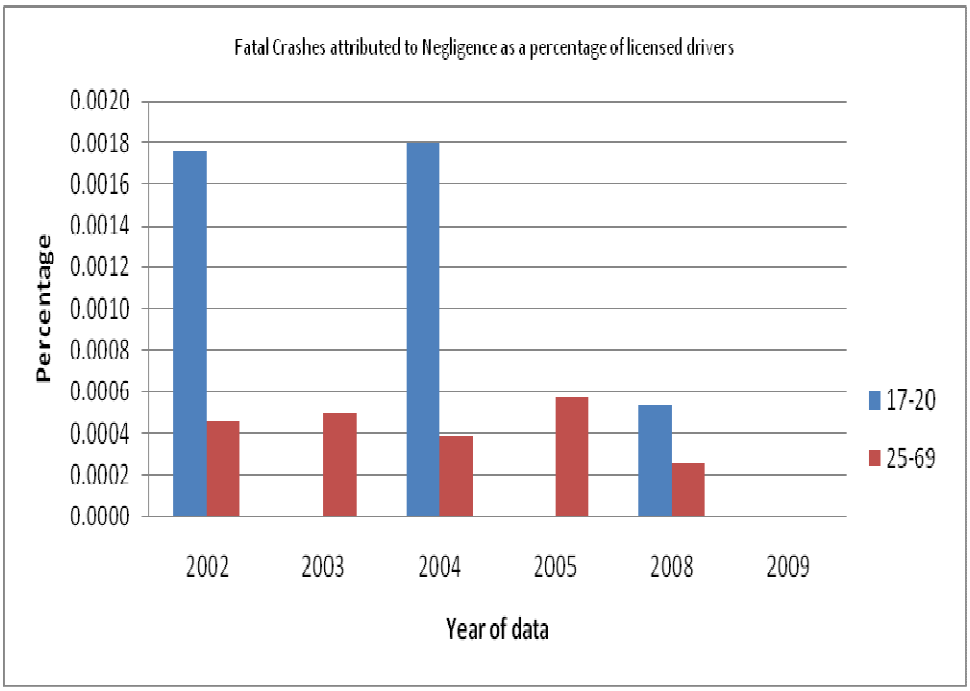
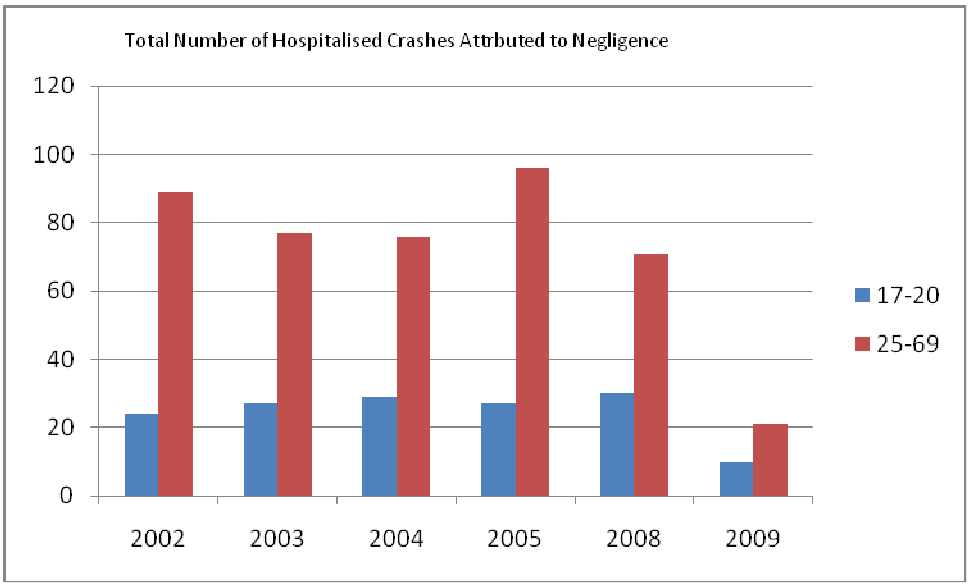


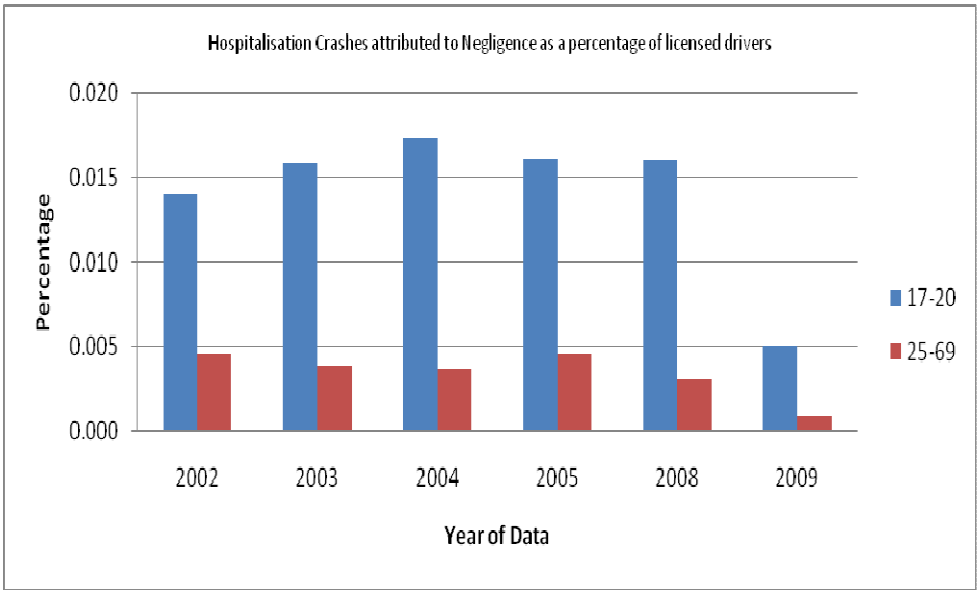
Table 4. 16: Hospitalisation crashes: Negligence

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	24	170,407	0.014	89	1,952,038	0.005
2003	27	169,987	0.016	77	2,007,546	0.004
2004	29	167,117	0.017	76	2,052,151	0.004
2005	27	168,247	0.016	96	2,100,795	0.005
2008	30	187,393	0.016	71	2,312,086	0.003
2009	10	199,173	0.005	21	2,388,047	0.001

Graph 4. 27



Graph 4. 28



Very few fatalities for 17 to 20 year old drivers have been attributed to negligence. Due to the very low numbers any changes in recorded fatalities can be attributed to the random nature of accidents, not the new GDL program. Additionally 2009 data records zero fatalities for the comparison group. This zero result means the effectiveness of the treatment cannot be determined using the method adopted in this study (see graph 4.25, 4.26 and table 4.15).

Hospitalisation crashes attributed to negligence have changed very little since the implementation of the new GDL program for 17 to 20 year olds. This is displayed both in the number of hospitalisation crashes; a 10% increase from 2005 and the percentage of licensed drivers; a 0.24% decrease from 2005 (see graph 4.27 and 4.28). In contrast the 2008 data for the comparison group indicates the number of crashes attributed to negligence have reduced by 35.2% from the 2005 total.

While preliminary 2009 data indicates there has been a reduction in hospitalisation rates for both groups this is not definitive as the data has only been finalised up to 30th September 2009.

The available data indicates the new GDL program has had little impact on addressing hospitalisation crashes attributed to negligence.

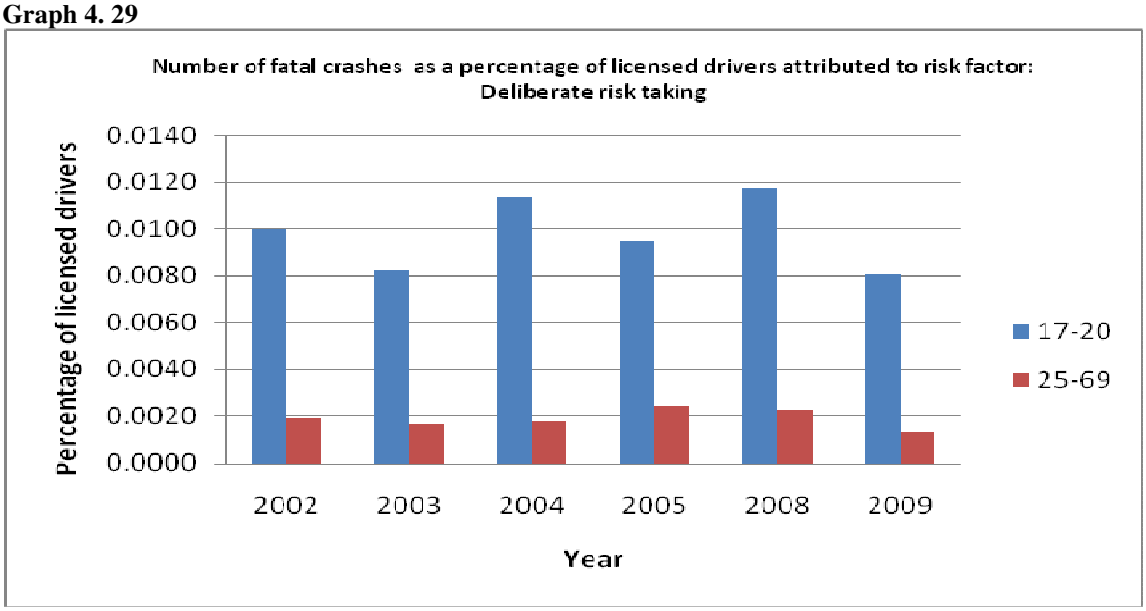
4.3.3 Discussion for Risk Factor: Deliberate Risk Taking

Data for the contributing circumstances speed related and negligence has been combined to determine the overall impact the new GDL program has had on addressing the risk factor 'deliberate risk taking'. This data is contained in Table 4.17 and 4.18 and in Graph 4.29 and 4.30.

Table 4. 17: Fatal crashes: Risk factor – Deliberate risk taking

Number of Fatal Crashes (Risk Factor: Deliberate Risk Taking)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	17	170,407	0.0100	38	1,952,038	0.0019
2003	14	169,987	0.0082	33	2,007,546	0.0016
2004	19	167,117	0.0114	36	2,052,151	0.0018
2005	16	168,247	0.0095	51	2,100,795	0.0024
2008	22	187,393	0.0117	52	2,312,086	0.0022
2009	16	199,173	0.0080	31	2,388,047	0.0013

Graph 4. 29



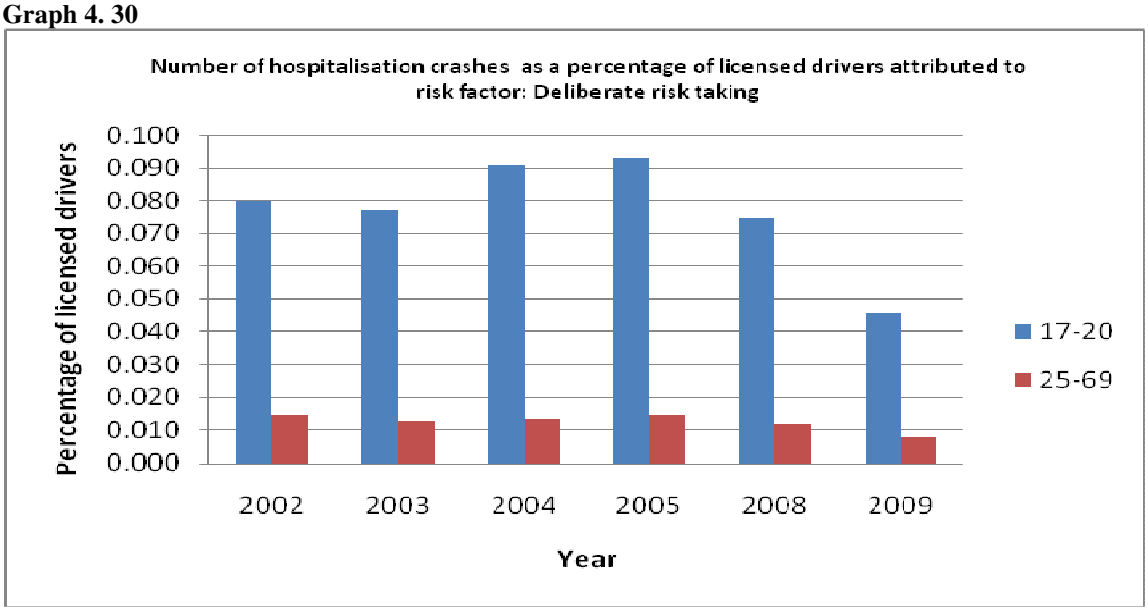
In 2008 fatal crashes attributed to deliberate risk taking increased as a percentage of licensed drivers by 19% from the 2005 total for 17 to 20 year olds while in the same period fatal crashes for the comparison group reduced by 7.9%. In 2009 fatal crashes as a percentage of licensed drivers reduced by 18.3% from the 2005 total for 17 to 20 year olds. However the comparison group reduced by 87% for the same periods.

The large reductions in fatal crashes for the comparison group and the increase in fatal crashes for 17 to 20 year olds in 2008 indicates the new GDL program has had very little impact on addressing fatalities linked to the risk factor 'deliberate risk taking'.

Table 4. 18: Hospitalisation crashes: Risk factor – Deliberate risk taking

Number of Hospitalised Crashes (Risk Factor: Deliberate Risk Taking)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	136	170,407	0.080	280	1,952,038	0.014
2003	131	169,987	0.077	253	2,007,546	0.013
2004	152	167,117	0.091	275	2,052,151	0.013
2005	157	168,247	0.093	302	2,100,795	0.014
2008	140	187,393	0.075	270	2,312,086	0.012
2009	91	199,173	0.046	187	2,388,047	0.008

Graph 4. 30



Hospitalisation crashes attributed to the risk factor deliberate risk taking have reduced for both the target group (17 to 20 year olds) and comparison group since the implementation of the new GDL program.

In 2008 the number of hospitalisation crashes as a percentage of licensed drivers decreased by 24.9% for 17 to 20 year olds and by 23.1% for the comparison group from the 2005 peak.

While the reduction in hospitalisation crashes is pleasing it cannot be attributed to the new GDL program due to the very similar percentage reductions recorded for both target and comparison group.

4.4 Risk Factor: Inability to Identify Risks or Hazards

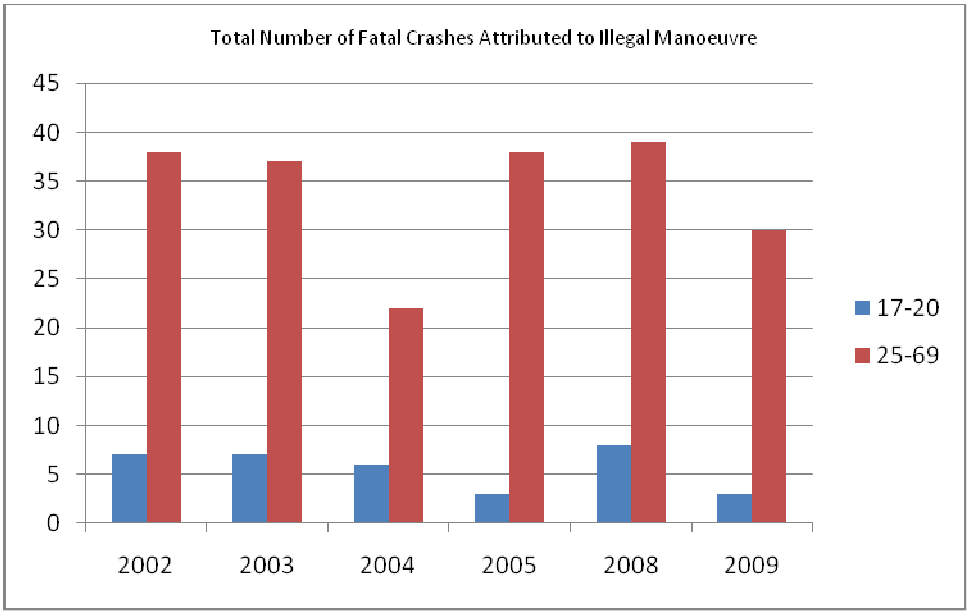
4.4.1 Contributing Circumstance: Illegal Traffic Manoeuvre

Data pertaining to accidents attributed to undue care and attention is displayed in Graph 4.31 to 4.34 and Table 4.19 and 4.20.

Table 4. 19: Fatal crashes: Illegal traffic manoeuvre

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	7	170,407	0.0041	38	1,952,038	0.0019
2003	7	169,987	0.0041	37	2,007,546	0.0018
2004	6	167,117	0.0036	22	2,052,151	0.0011
2005	3	168,247	0.0018	38	2,100,795	0.0018
2008	8	187,393	0.0043	39	2,312,086	0.0017
2009	3	199,173	0.0015	30	2,388,047	0.0013

Graph 4. 31



Graph 4. 32

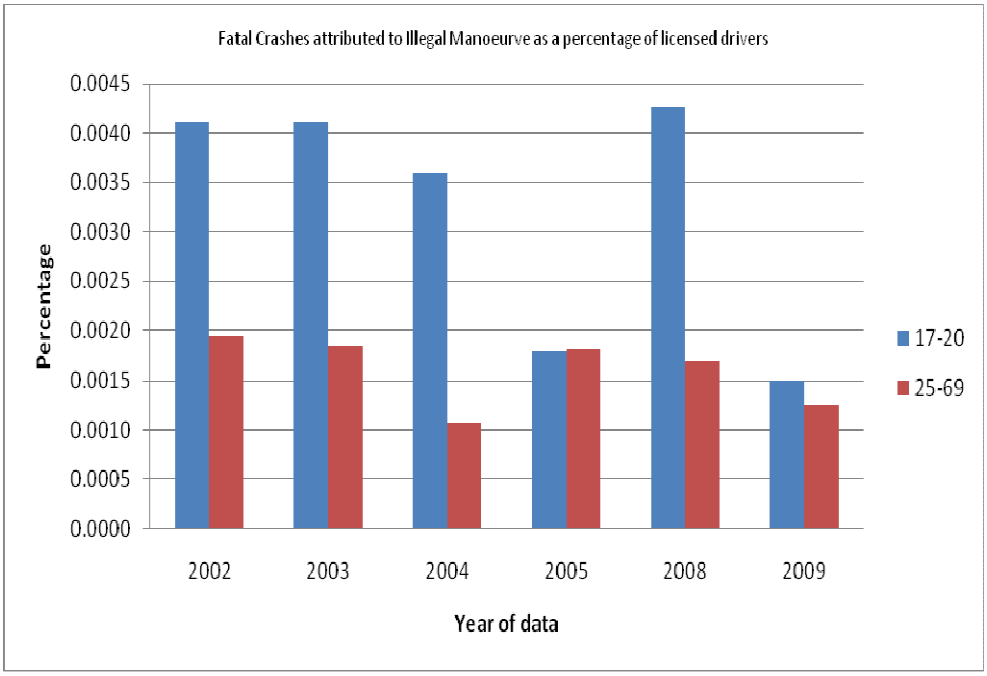
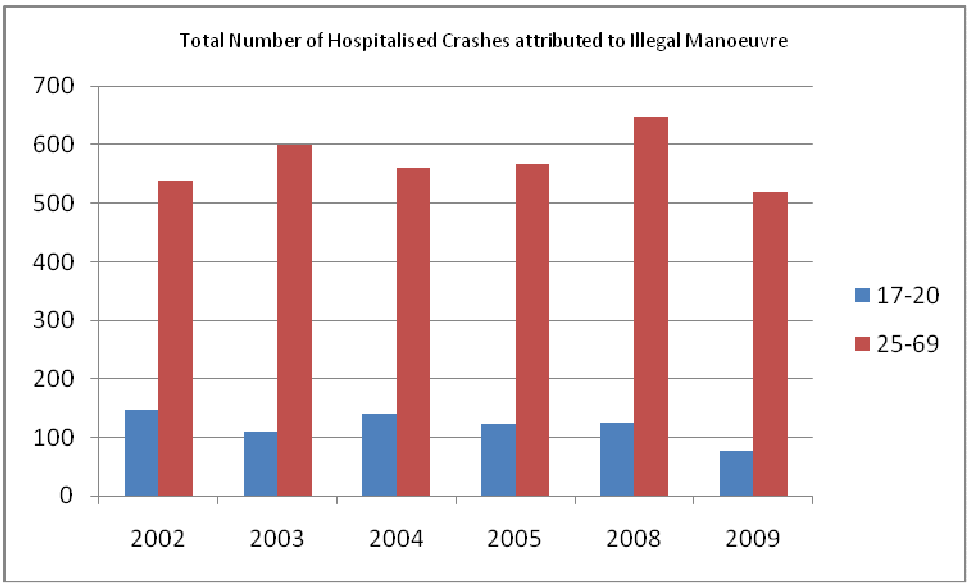


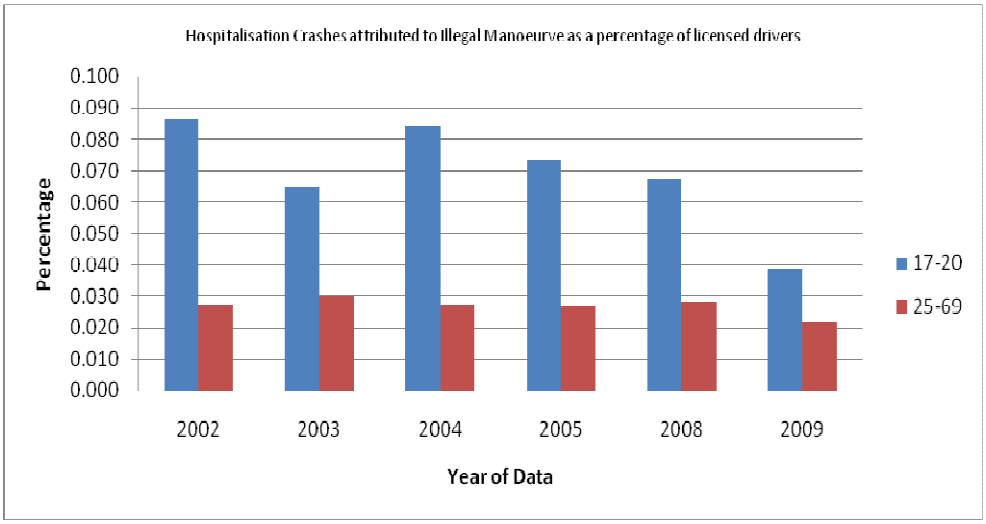
Table 4. 20: Hospitalisation crashes: Illegal traffic manoeuvre

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	147	170,407	0.086	538	1,952,038	0.028
2003	110	169,987	0.065	599	2,007,546	0.030
2004	141	167,117	0.084	561	2,052,151	0.027
2005	124	168,247	0.074	567	2,100,795	0.027
2008	126	187,393	0.067	649	2,312,086	0.028
2009	77	199,173	0.039	518	2,388,047	0.022

Graph 4. 33



Graph 4. 34



Fatalities attributed to an illegal manoeuvre have fluctuated for 17 to 20 year old drivers. In 2008 the number of fatalities increased to 8 (the highest recorded for the years researched) but reduced to 3 in 2009 (the lowest recorded for the years researched). These fluctuations are mirrored as a percentage of 17 -20 year old licensed drivers (see graph 4.25 and 4.26).

The comparison group however has displayed a downward trend for fatalities as a percentage of licensed drivers since 2005.

The fluctuating number of fatalities for 17 to 20 year olds and steady decline for the comparison group indicate the new GDL has at this point in time had little to no impact on addressing fatalities attributed to an illegal manoeuvre for 17 to 20 year olds.

The available data indicates that hospitalisation crashes attributed to an illegal manoeuvre for 17 to 20 year old drivers has been downward trending since 2004 while the comparison group's hospitalisation rates as a percentage of licensed drivers have remained fairly constant. The decrease for 17 to 20 year old hospitalisation crashes as a percentage of licensed drivers in 2008 appears to be a continuation of the downward trend and therefore there is insufficient evidence to attribute any reduction to the new GDL program (see graph 4.27 and 4.28).

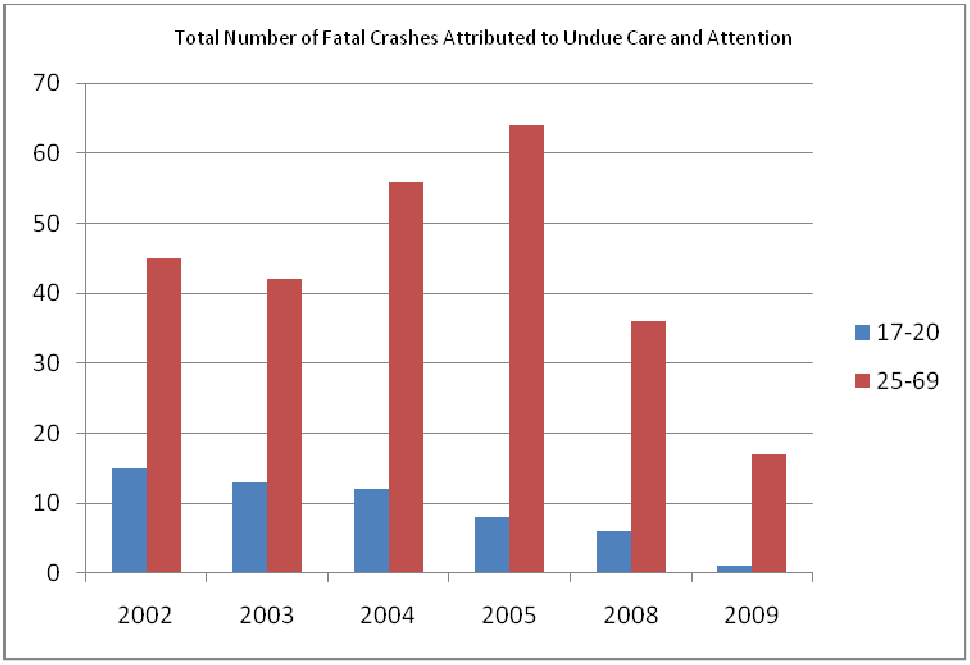
4.4.2 Contributing Circumstance: Undue Care and Attention

Data pertaining to accidents attributed to illegal traffic manoeuvres is displayed in Graph 4.35 to 4.38 and Table 4.21 and Table 2.22.

Table 4. 21: Fatal crashes: Undue care and attention

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	15	170,407	0.0088	45	1,952,038	0.0023
2003	13	169,987	0.0076	42	2,007,546	0.0021
2004	12	167,117	0.0072	56	2,052,151	0.0027
2005	8	168,247	0.0048	64	2,100,795	0.0030
2008	6	187,393	0.0032	36	2,312,086	0.0016
2009	1	199,173	0.0005	17	2,388,047	0.0007

Graph 4. 35



Graph 4. 36

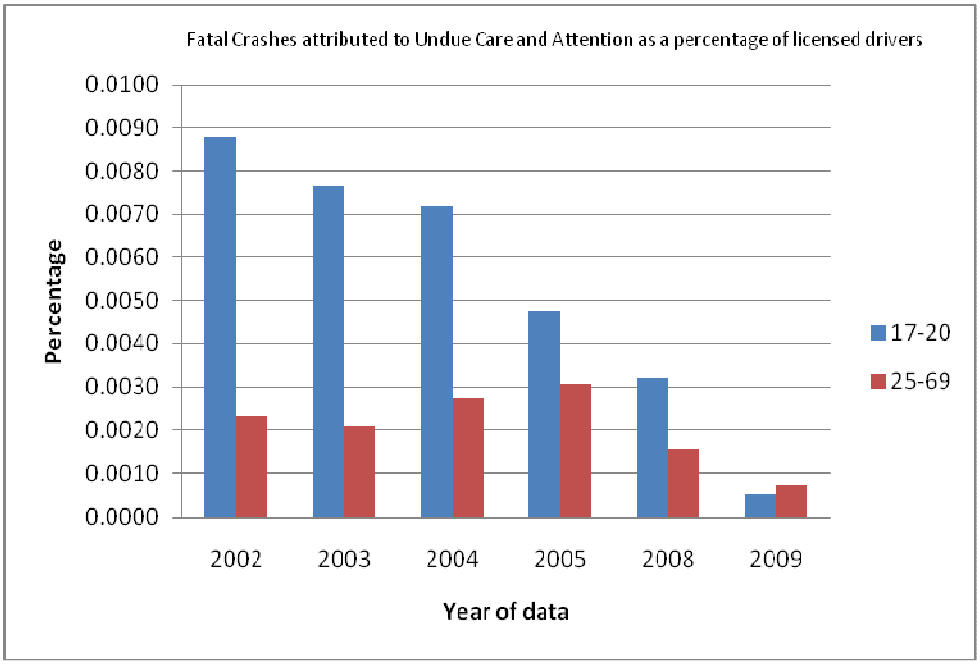
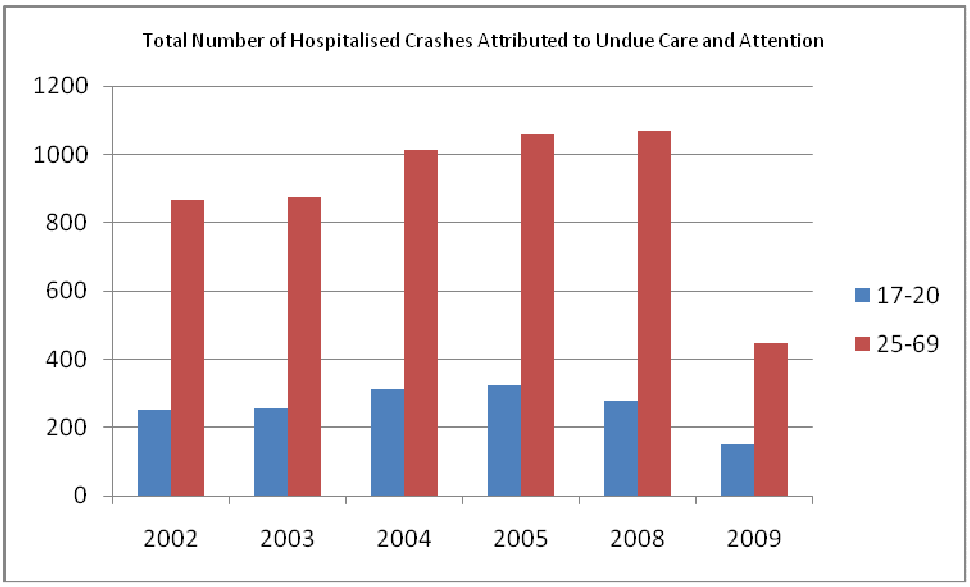


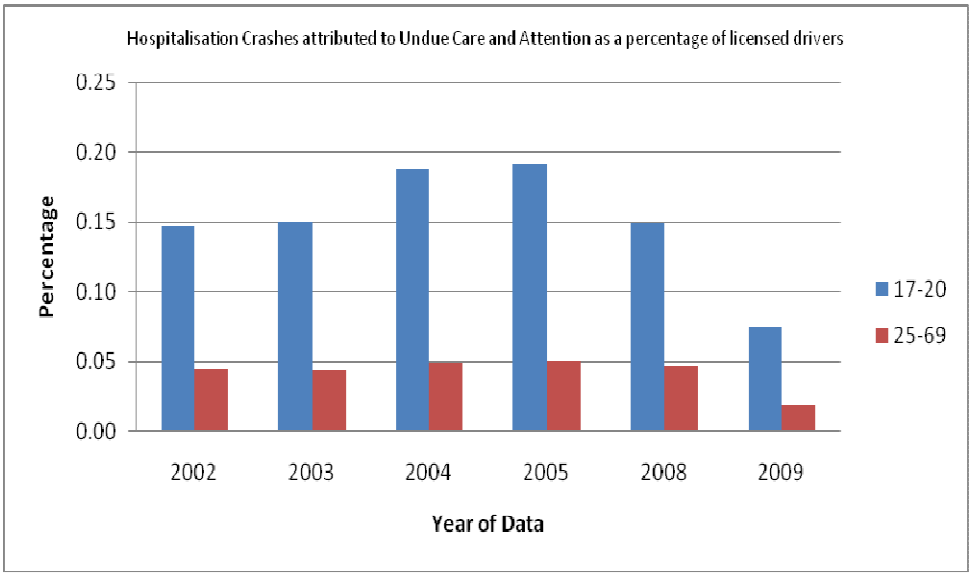
Table 4. 22: Hospitalisation crashes: Undue care and attention

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	252	170,407	0.148	869	1,952,038	0.045
2003	255	169,987	0.150	876	2,007,546	0.044
2004	314	167,117	0.188	1012	2,052,151	0.049
2005	322	168,247	0.191	1060	2,100,795	0.050
2008	280	187,393	0.149	1069	2,312,086	0.046
2009	151	199,173	0.076	449	2,388,047	0.019

Graph 4. 37



Graph 4. 38



Fatalities determined to have resulted from undue care and attention have continued to trend down for 17 to 20 year old drivers since 2004. While the reductions in the number of fatalities recorded in 2009 for 17 to 20 year old drivers has reduced significantly more than the comparison group it still adheres to the downward trend that is evident in the previous years. Therefore there is insufficient evidence to conclude that the new GDL program is responsible for the reduction in fatalities attributed to undue care and attention (see graph 4.29 and 4.30).

Prior to the implementation of the new GDL program the number of hospitalisation crashes attributed to undue care and attention for 17 to 20 year old drivers and the comparison group both adhered to an upward trend. The available data indicates this trend reversed in 2008 for 17 to 20 year olds but the comparison group continued to increase (see graph 4.31). However, as a percentage of licensed drivers, the 2008 hospitalisation total for both the 17 to 20 year old group and the comparison group reduced.

The 17 to 20 year old group reduced by 28% from the 2005 peak for crashes attributed to undue care and attention while the comparison group reduced by 9% for the same period (see graph 4.32).

The marked difference in the number of hospitalisation crashes attributed to undue care and attention for 17 to 20 year olds is positive however as the comparison group also experienced a reduction as a percentage of licensed drivers the entire decrease cannot be attributed solely to the new GDL program.

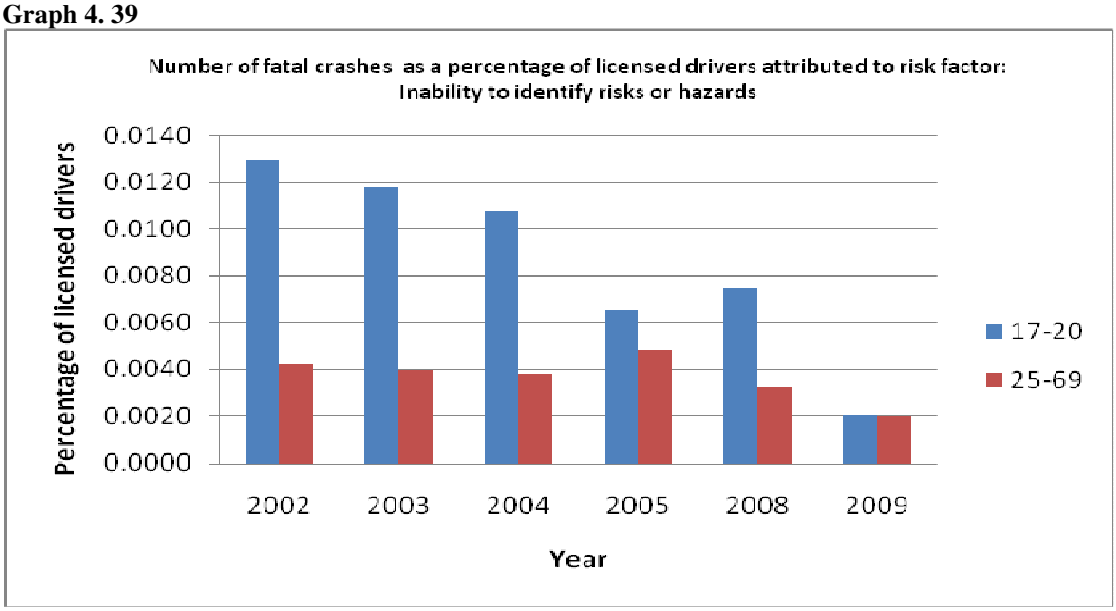
4.4.3 Discussion for Risk Factor: Inability to Identify Risks or Hazards

Data for the contributing circumstances illegal traffic manoeuvre and undue care and attention has been combined to determine the overall impact the new GDL program has had on addressing the risk factor 'inability to identify risks or hazards'. This data is contained in Table 4.23 and 4.24 and in Graph 4.39 and 4.40.

Table 4. 23: Fatal crashes: Risk factor – Inability to identify risks or hazards

Number of Fatal Crashes (Risk Factor: Inability to Identify Risks or Hazards)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	22	170,407	0.0129	83	1,952,038	0.0043
2003	20	169,987	0.0118	79	2,007,546	0.0039
2004	18	167,117	0.0108	78	2,052,151	0.0038
2005	11	168,247	0.0065	102	2,100,795	0.0049
2008	14	187,393	0.0075	75	2,312,086	0.0032
2009	4	199,173	0.0020	47	2,388,047	0.0020

Graph 4. 39



There is little evidence indicating that the new GDL program has had any impact on addressing fatalities resulting from the risk factor 'inability to identify risks or hazards'.

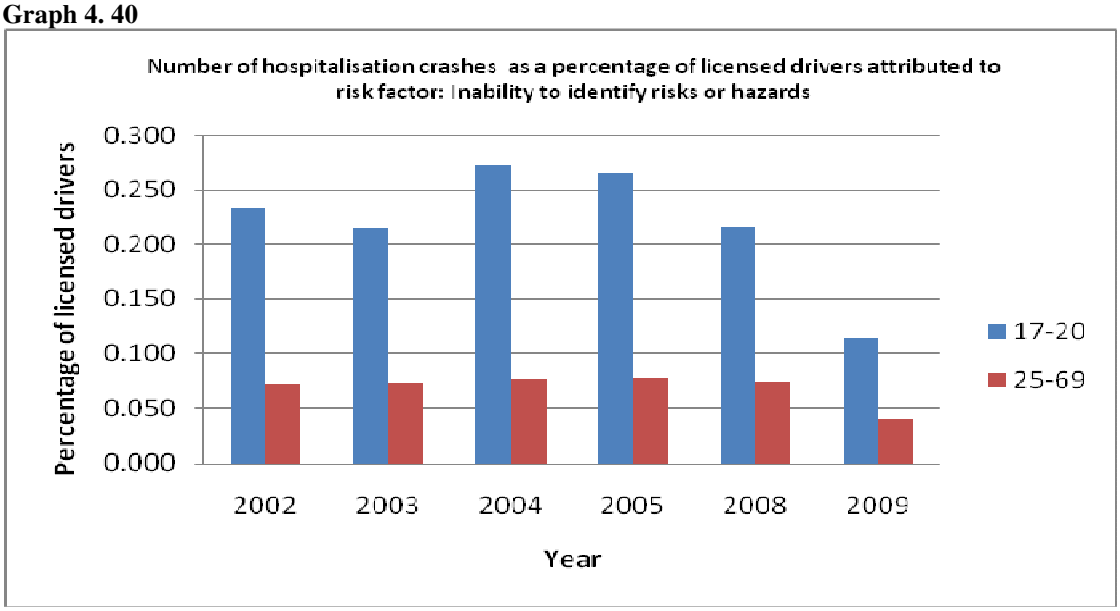
From 2002 to 2004 fatal accidents attributed to the risk factor 'deliberate risk taking' as a percentage of licensed drivers had been adhering to a downward trend for both the comparison group and 17 to 20 year olds. In 2005 this trend continued for 17 to 20 year olds however the comparison group saw an increase in fatalities; 24 more fatalities than 2004.

After the implementation of the new GDL program, the number of fatalities as a percentage of licensed drivers for 2008 and 2009 for the comparison group returned to the downward trend from 2002 to 2004. However the number of fatalities as a percentage of licensed drivers for 17 to 20 year olds increased in 2008; 3 more fatalities than 2005; but returned to the downward trend in 2009.

Table 4. 24: Hospitalisation crashes: Risk factor – Inability to identify risks or hazards

Number of Hospitalised Crashes (Risk Factor: Inability to Identify Risks or Hazards)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	399	170,407	0.234	1407	1,952,038	0.072
2003	365	169,987	0.215	1475	2,007,546	0.073
2004	455	167,117	0.272	1573	2,052,151	0.077
2005	446	168,247	0.265	1627	2,100,795	0.077
2008	406	187,393	0.217	1718	2,312,086	0.074
2009	228	199,173	0.114	967	2,388,047	0.040

Graph 4. 40



The preliminary data indicates the number of hospitalisation crashes as a percentage of licensed drivers reduced by 28% in 2008 for accidents attributed to undue care and attention for 17 to 20 year old drivers from the 2005 total. In the same period the comparison group also experienced a reduction in hospitalisation crashes as a percentage of licensed drivers of 9%.

The reduction in hospitalisation crashes is more significant for 17 to 20 year olds than the comparison group. However as the comparison group experience a reduction as well any decrease cannot be attributed solely to the new GDL program.

4.5 Risk Factor: Overconfidence

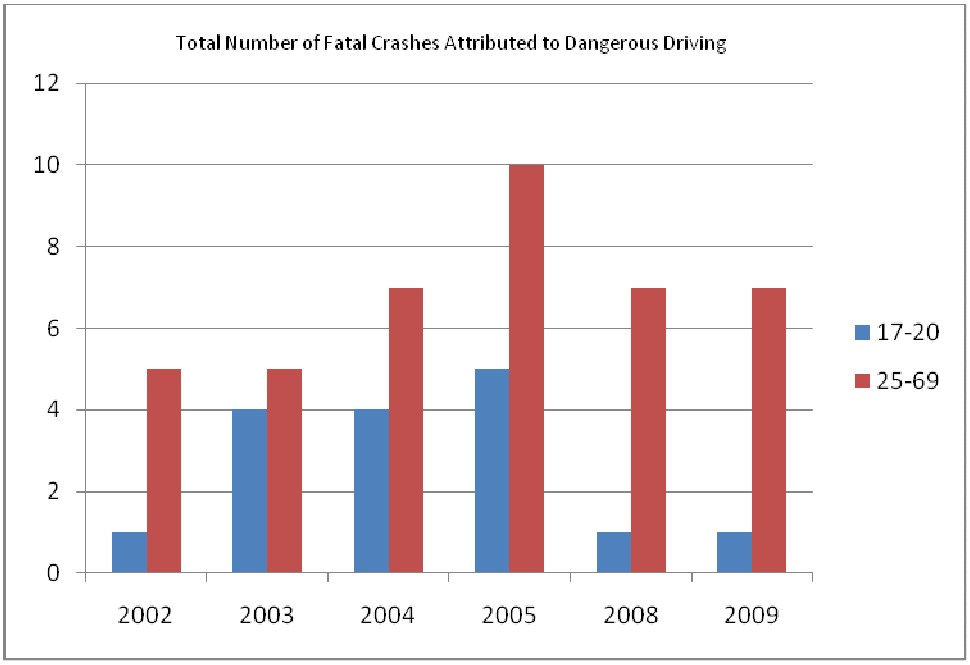
4.5.1 Contributing Circumstance: Dangerous Driving

Data pertaining to accidents attributed to dangerous driving is displayed in Graph 4.41 to 4.44 and Table 4.25 and 4.26.

Table 4. 25: Fatal crashes: Dangerous driving

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	1	170,407	0.0006	5	1,952,038	0.0003
2003	4	169,987	0.0024	5	2,007,546	0.0002
2004	4	167,117	0.0024	7	2,052,151	0.0003
2005	5	168,247	0.0030	10	2,100,795	0.0005
2008	1	187,393	0.0005	7	2,312,086	0.0003
2009	1	199,173	0.0005	7	2,388,047	0.0003

Graph 4. 41



Graph 4. 42

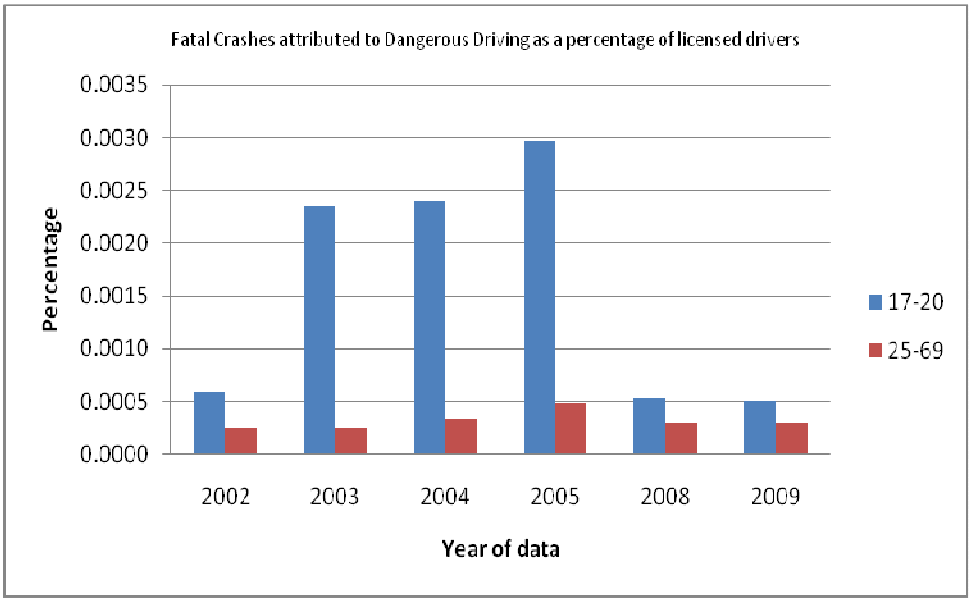
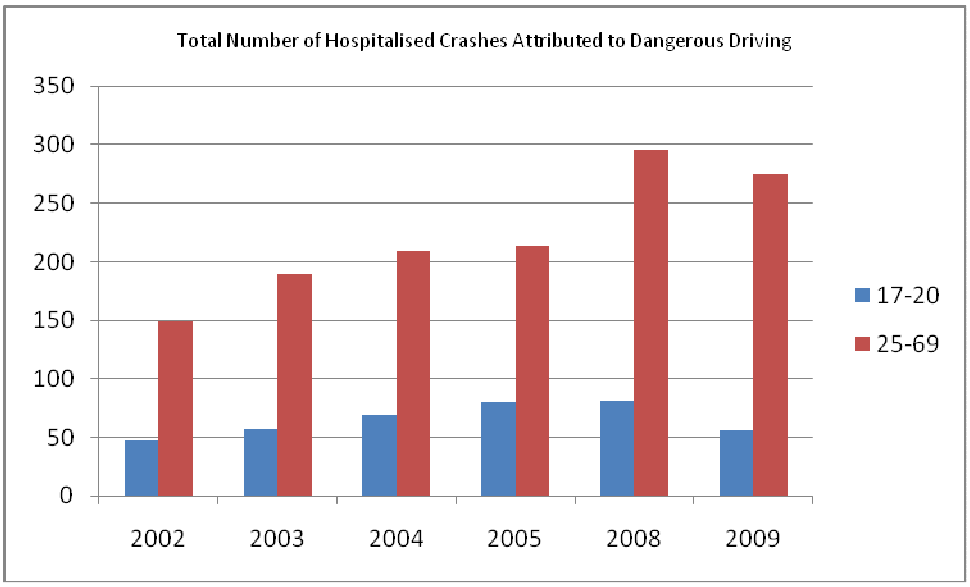


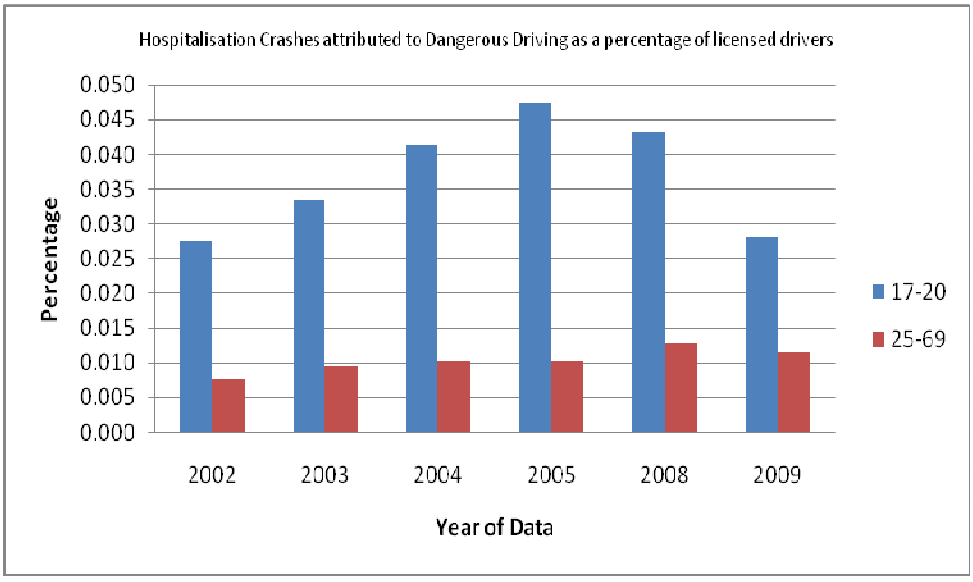
Table 4. 26: Hospitalisation crashes: Dangerous driving

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	47	170,407	0.028	149	1,952,038	0.008
2003	57	169,987	0.034	189	2,007,546	0.009
2004	69	167,117	0.041	209	2,052,151	0.010
2005	80	168,247	0.048	214	2,100,795	0.010
2008	81	187,393	0.043	296	2,312,086	0.013
2009	56	199,173	0.028	275	2,388,047	0.012

Graph 4. 43



Graph 4. 44



Prior to the implementation of the new GDL program, fatalities attributed to dangerous driving were trending upwards for drivers in the target group (17 to 20 years) and the comparison group. While there has been a reduction in the number of fatalities recorded in both groups since the introduction of the new GDL program, the reduction is far more significant in the 17 to 20 year old group (see graph 4.33 and 4.34).

The reduction in the number of fatalities for 17 to 20 year olds from the 2005 peak is 400%. However, as the number of fatalities recorded is very low, a maximum of 5 and minimum of 1, the reduction could also be attributed to the randomness of crashes. The preliminary data is positive however further research is required before a definitive conclusion can be reached.

Hospitalisation rates for the comparison group have continued to trend up since the implementation of the new GDL program. This is not the case though for the target group (see graph 4.35 and 4.36).

The number of hospitalisations resulting from crashes attributed to dangerous driving for 17 to 20 year olds is higher in 2008 than 2005 (81 for 2008, 80 for 2005). However, as a percentage of licensed drivers, the 2008 data indicates the upward trend in hospitalisation rates attributed to dangerous driving has reversed for the target group, reducing by 10%. In contrast the number of hospitalisation crashes attributed to dangerous driving for the comparison group in 2008 increased by 27.7% from the 2005 total. As a percentage of licensed drivers this increase resulted in a 20.4% increase from the 2005 total to the 2008 total.

This reduction in hospitalisation crashes as a percentage of licensed drivers for 17 to 20 year olds is in stark contrast to the increase experienced by the comparison group. It is therefore concluded that the new GDL program has had a positive impact on addressing hospitalisation crashes resulting from dangerous driving.

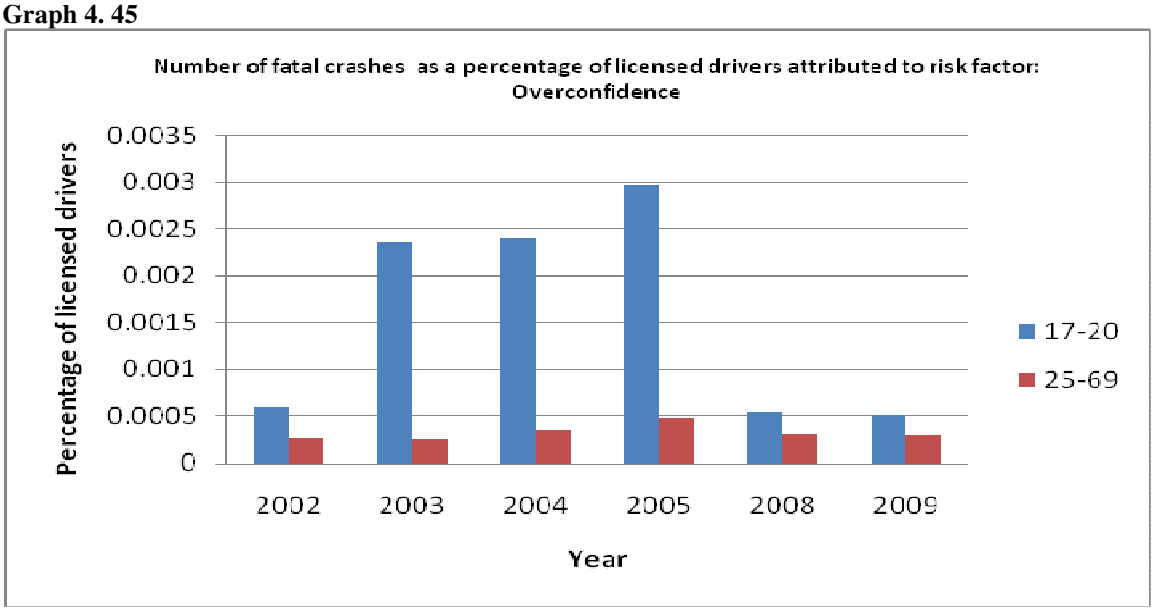
4.5.2 Discussion for Risk Factor: Overconfidence

Data for the contributing circumstance dangerous driving has been utilised to determine the overall impact the new GDL program has had on addressing the risk factor 'overconfidence'. This data is contained in Table 4.27 and 4.28 and in Graph 4.45 and 4.46.

Table 4. 27: Fatal crashes: Risk factor - Overconfidence

Number of Fatal Crashes (Risk Factor: Overconfidence)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	1	170,407	0.0006	5	1,952,038	0.0003
2003	4	169,987	0.0024	5	2,007,546	0.0002
2004	4	167,117	0.0024	7	2,052,151	0.0003
2005	5	168,247	0.0030	10	2,100,795	0.0005
2008	1	187,393	0.0005	7	2,312,086	0.0003
2009	1	199,173	0.0005	7	2,388,047	0.0003

Graph 4. 45

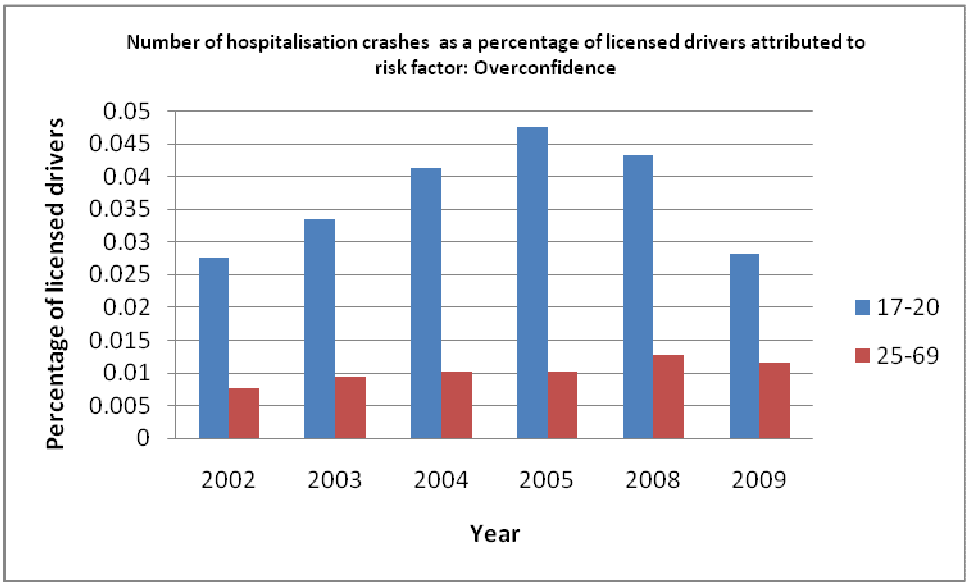


Preliminary data is positive with regards to a reduction in fatal crashes attributed to the risk factor 'overconfidence' however, as the number of fatalities is very low, it is recommended that further analysis be conducted on the forthcoming years of crash data to determine if the impact is a result of the GDL implementation or an anomaly due to the randomness of crashes.

Table 4. 28: Hospitalisation crashes: Risk factor - Overconfidence

Number of Hospitalised Crashes (Risk Factor: Overconfidence)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	47	170,407	0.028	149	1,952,038	0.008
2003	57	169,987	0.034	189	2,007,546	0.009
2004	69	167,117	0.041	209	2,052,151	0.010
2005	80	168,247	0.048	214	2,100,795	0.010
2008	81	187,393	0.043	296	2,312,086	0.013
2009	56	199,173	0.028	275	2,388,047	0.012

Graph 4. 46



While the impact the new GDL program has had on fatalities resulting from overconfidence is inconclusive, the impact on hospitalisation rates is clearer. Prior to the implementation of the new GDL program hospitalisation rates were trending up for both the target and comparison group.

In 2008, post GDL, the upward trend reversed for the target group (17 to 20 years) while the comparison group continued to increase. As a percentage of licensed drivers, hospitalisation crashes attributed to the risk factor 'overconfidence' increased in 2008 by 20.4% from the 2005 total for the comparison group, while during the same period 17 to 20 year olds decreased by 10%.

4.6 Risk Factor: Inattention / Distraction

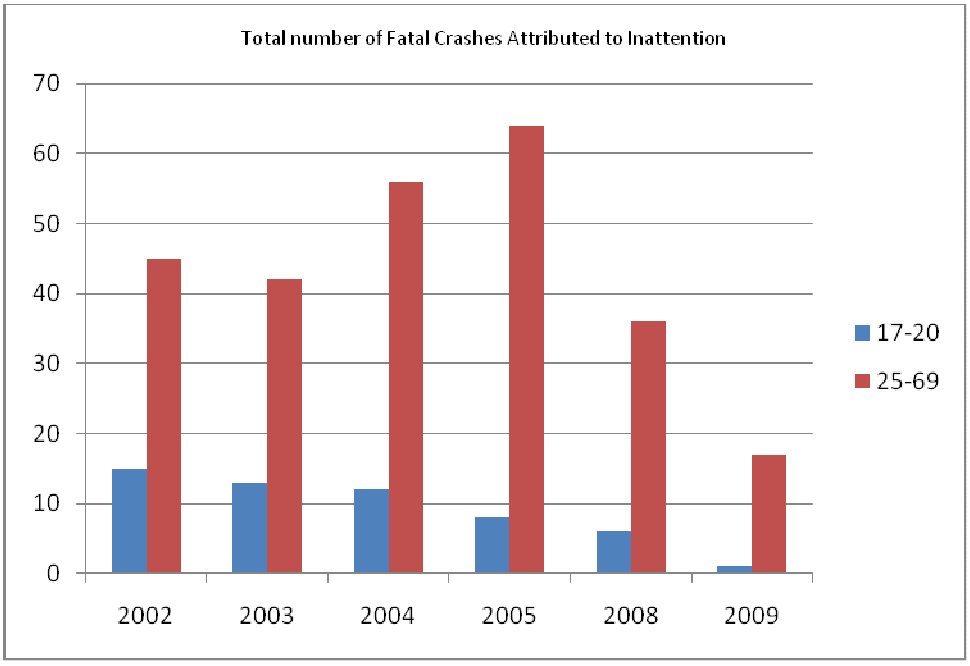
4.6.1 Contributing Circumstance: Inattention

Data pertaining to accidents attributed to inattention is displayed in Graph 4.47 to 4.50 and Table 4.29 and 4.30.

Table 4. 29: Fatal crashes: Inattention

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	15	170,407	0.0088	45	1,952,038	0.0023
2003	13	169,987	0.0076	42	2,007,546	0.0021
2004	12	167,117	0.0072	56	2,052,151	0.0027
2005	8	168,247	0.0048	64	2,100,795	0.0030
2008	6	187,393	0.0032	36	2,312,086	0.0016
2009	1	199,173	0.0005	17	2,388,047	0.0007

Graph 4. 47



Graph 4. 48

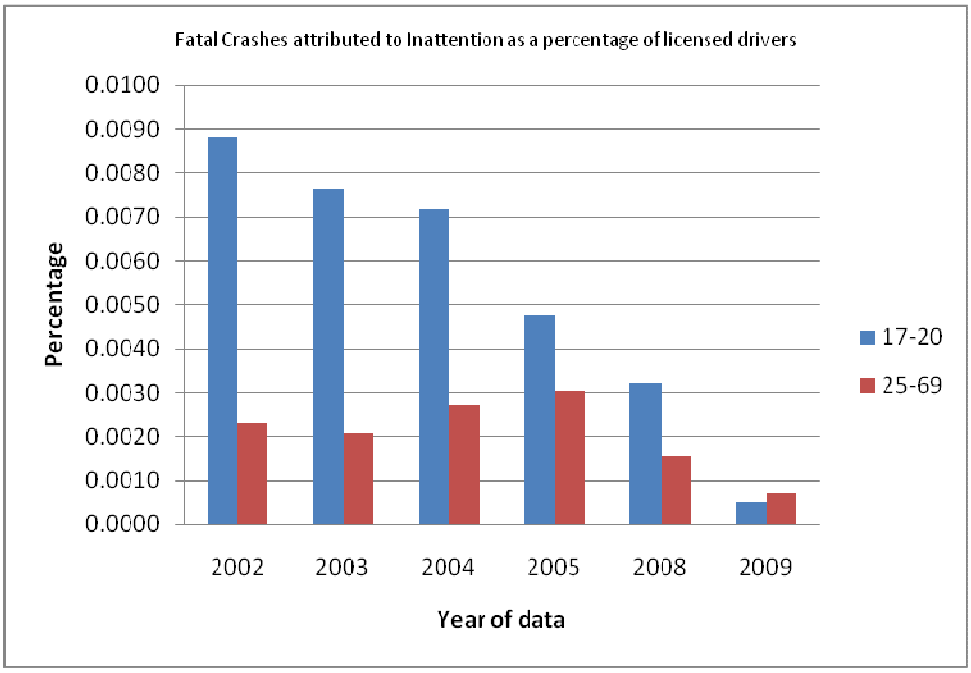
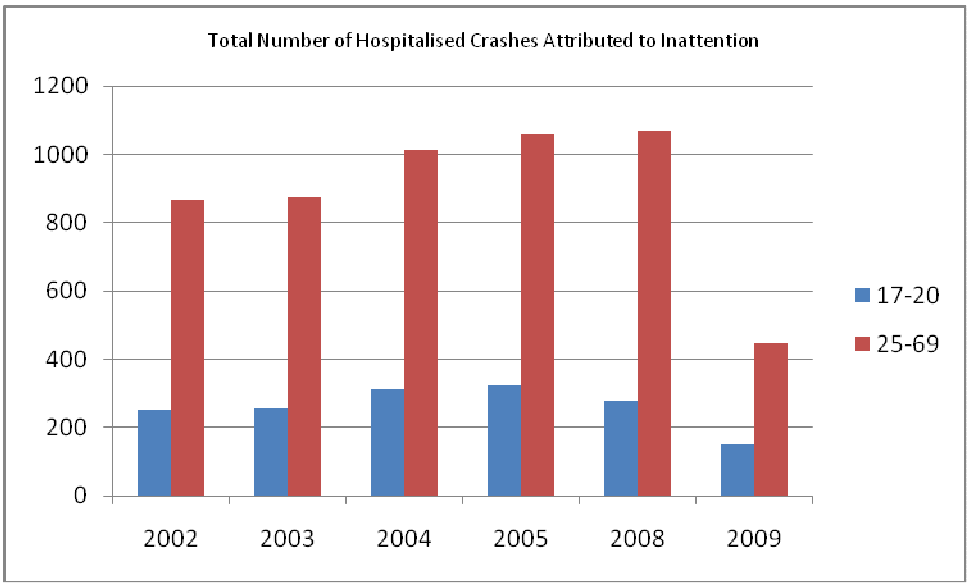


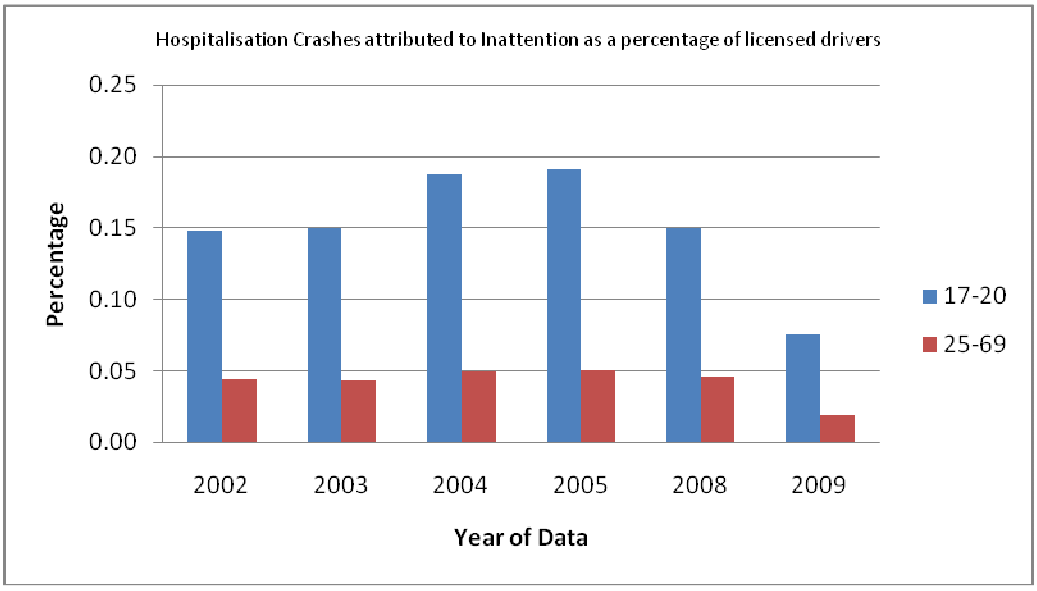
Table 4. 30: Hospitalisation crashes: Inattention

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	252	170,407	0.148	869	1,952,038	0.045
2003	255	169,987	0.150	876	2,007,546	0.044
2004	314	167,117	0.188	1012	2,052,151	0.049
2005	322	168,247	0.191	1060	2,100,795	0.050
2008	280	187,393	0.149	1069	2,312,086	0.046
2009	151	199,173	0.076	449	2,388,047	0.019

Graph 4. 49



Graph 4. 50



The available data indicates fatal crashes attributed to inattention for 17 to 20 year olds have been trending downward since 2002. While recording only one fatality for 17 to 20 year old drivers in 2009 is a positive result, the downward trend displayed before the implementation of the new GDL program indicates that the reduction in fatalities cannot be solely attributed to the new GDL program (see graph 4.37 and 4.38).

The number of hospitalisation crashes attributed to inattention has continued to increase for the comparison group from 2002 to 2008, increasing by 0.84% in 2008 from the 2005 figure. As a percentage of licensed drivers however the rate of hospitalisation reduced in 2008 by 9.1% from the 2005 peak.

In contrast, the number of hospitalisation crashes attributed to inattention for the target group has reduced by 15% since the implementation of the new GDL program, from a peak of 322 in 2005 to 280 in 2008. As a percentage of licensed drivers this reduction is 28% (see graph 4.39 and 4.40).

Preliminary results indicate that the new GDL program has had an impact on reducing the number of 17 to 20 year old drivers hospitalised as a result of inattention however, as the comparison group has also experienced a reduction as a percentage of licensed drivers, the entire decrease cannot be solely attributed to the new GDL program.

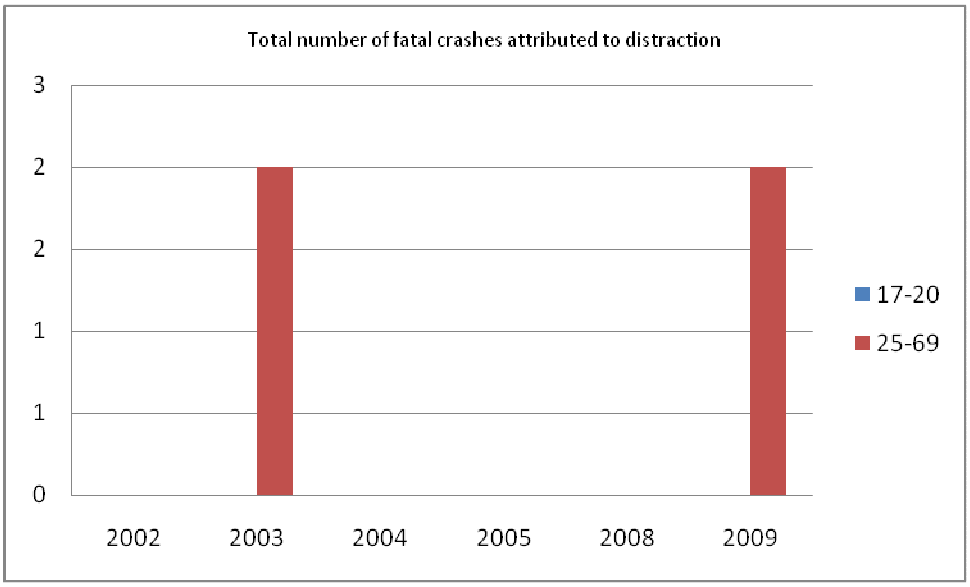
4.6.2 Contributing Circumstance: Distraction

Data pertaining to crashes attributed to distraction is displayed in Graph 4.51 to 4.54 and Table 4.31 and 4.32.

Table 4. 31: Fatal crashes: Distraction

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	0	170,407	0.0000	0	1,952,038	0.0000
2003	0	169,987	0.0000	2	2,007,546	0.0001
2004	0	167,117	0.0000	0	2,052,151	0.0000
2005	0	168,247	0.0000	0	2,100,795	0.0000
2008	0	187,393	0.0000	0	2,312,086	0.0000
2009	0	199,173	0.0000	2	2,388,047	0.0001

Graph 4. 51



Graph 4. 52

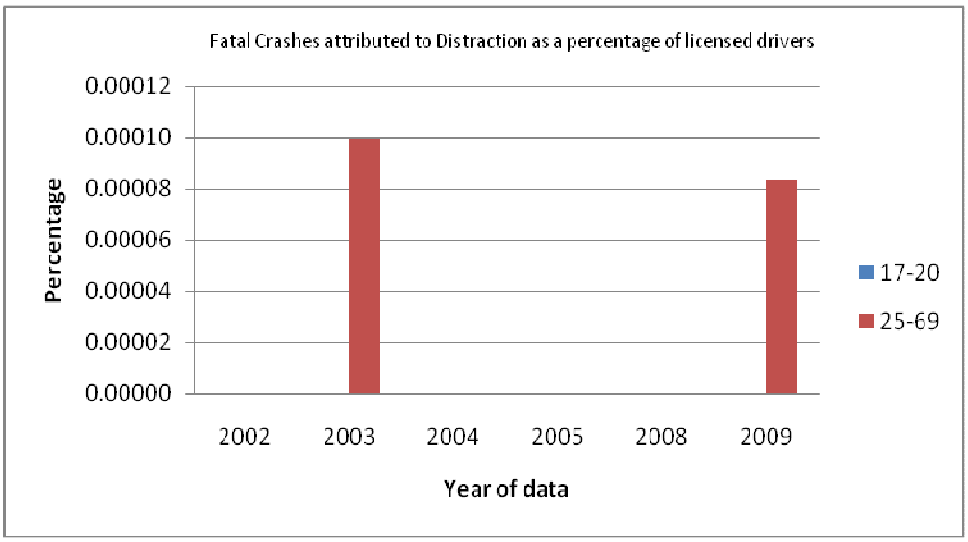
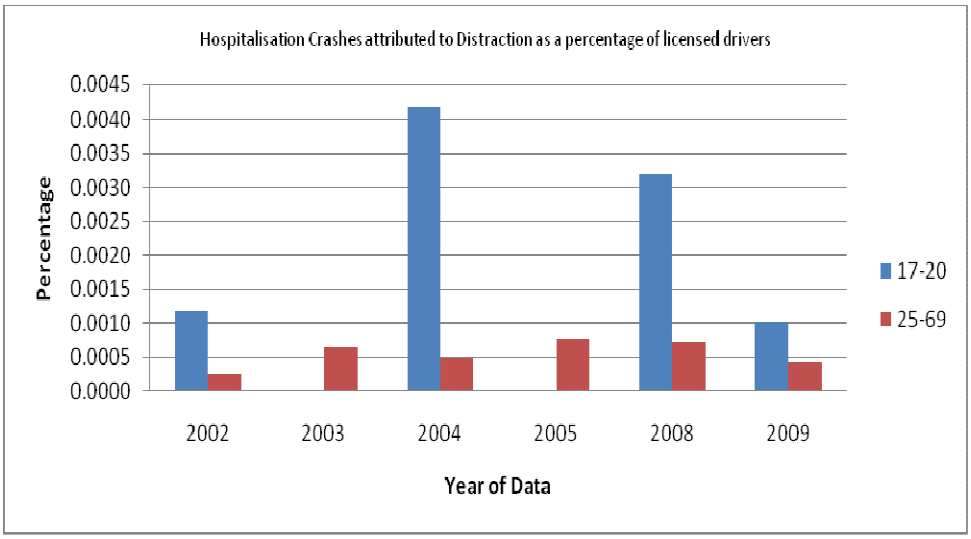


Table 4. 32: Hospitalisation crashes: Distraction

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	2	170,407	0.0012	5	1,952,038	0.0003
2003	0	169,987	0.0000	13	2,007,546	0.0006
2004	7	167,117	0.0042	10	2,052,151	0.0005
2005	0	168,247	0.0000	16	2,100,795	0.0008
2008	6	187,393	0.0032	17	2,312,086	0.0007
2009	2	199,173	0.0010	10	2,388,047	0.0004

Graph 4. 53

Graph 4. 54



No Fatalities have been attributed to distraction for drivers aged 17 to 20 in the years investigated (see graph 4.51 and 4.52). Therefore there is insufficent data to develop any conclusions regarding the effect the new GDL program has had on addressing fatalities attributed to distraction.

Very few hospitalisations have been attributed to distraction for 17 to 20 year old drivers in the years investigated (see graph 4.53 and 4.54). As such, conclusions cannot be reached regarding the impact the new GDL program has had on addressing hospitalisation crashes resulting from distraction.

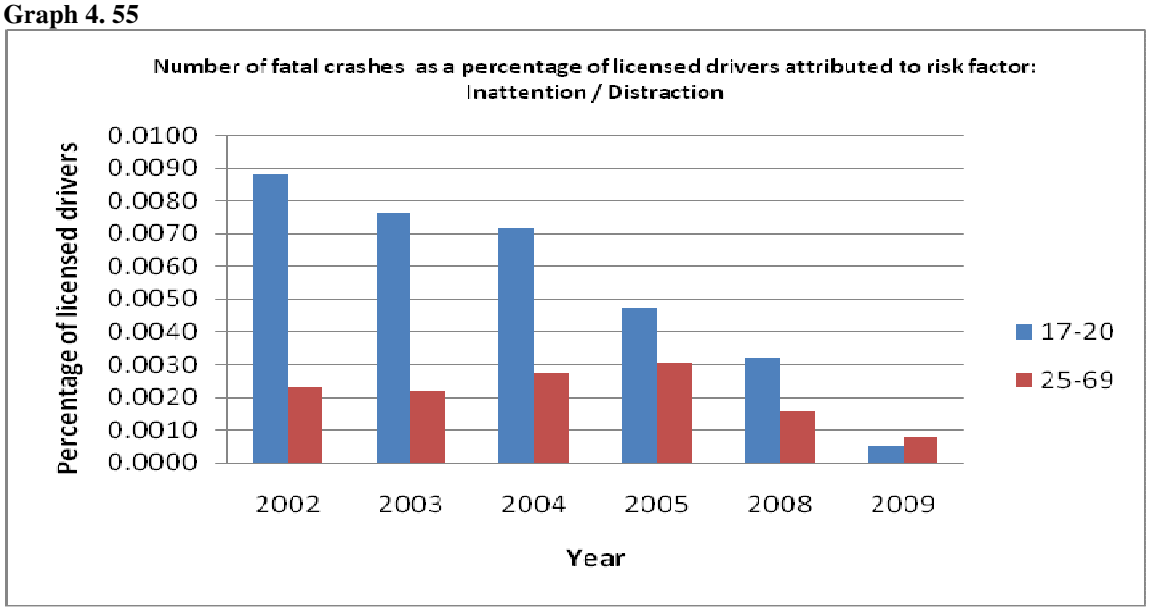
4.6.3 Discussion for Risk Factor: Inattention / Distraction

Data for the contributing circumstances inattention and distraction has been combined to determine the overall impact the new GDL program has had on addressing the risk factor 'inattention / distraction'. This data is contained in Table 4.33 and 4.34 and in Graph 4.55 and 4.56.

Table 4. 33: Fatal crashes: Risk factor – Inattention / distraction

Number of Fatal Crashes (Risk Factor: Inattention / Distraction)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	15	170,407	0.0088	45	1,952,038	0.0023
2003	13	169,987	0.0076	44	2,007,546	0.0022
2004	12	167,117	0.0072	56	2,052,151	0.0027
2005	8	168,247	0.0048	64	2,100,795	0.0030
2008	6	187,393	0.0032	36	2,312,086	0.0016
2009	1	199,173	0.0005	19	2,388,047	0.0008

Graph 4. 55



Prior to the implementation of the new GDL program in July 2007, fatal crashes as a percentage of licensed drivers for the target group (17 to 20 years) were trending down.

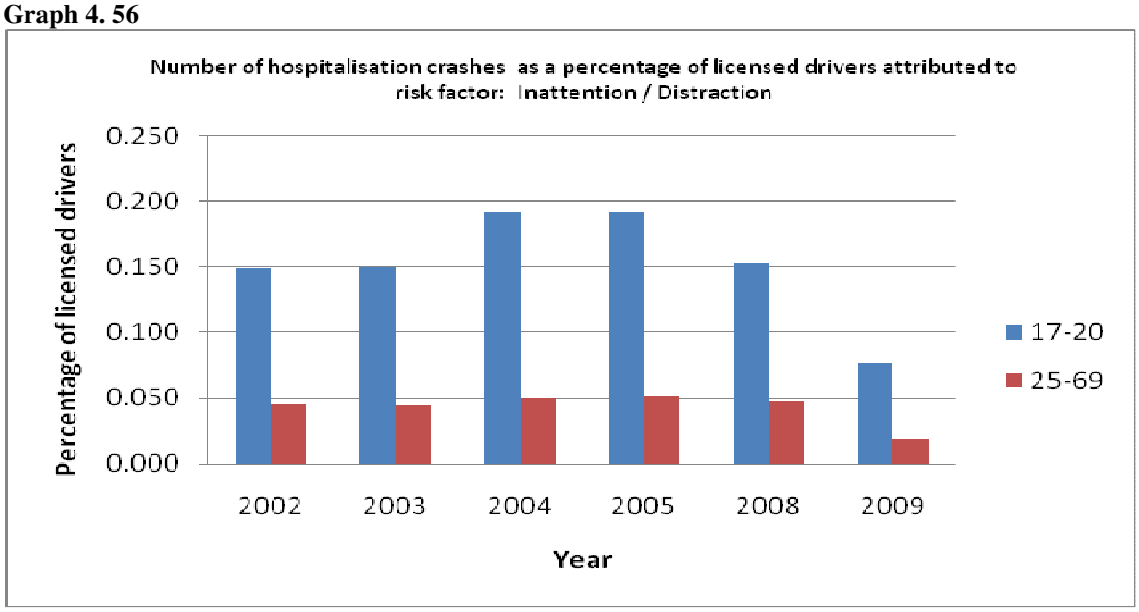
In 2008 and 2009 the number of fatal crashes involving 17 to 20 year olds continued to reduce, adhering to the existing downward trend.

While the reduction in fatal crashes involving 17 to 20 year old motorists is positive it cannot be solely attributed to the new GDL program due to the downward trend commencing before the implementation of the new GDL program.

Table 4. 34: Hospitalisation crashes: Risk factor – Inattention / distraction

Number of Hospitalised Crashes (Risk Factor: Inattention / Distraction)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	254	170,407	0.149	874	1,952,038	0.045
2003	255	169,987	0.150	889	2,007,546	0.044
2004	321	167,117	0.192	1022	2,052,151	0.050
2005	322	168,247	0.191	1076	2,100,795	0.051
2008	286	187,393	0.153	1086	2,312,086	0.047
2009	153	199,173	0.077	459	2,388,047	0.019

Graph 4. 56



Hospitalisation crashes for both the target group (17 to 20 years) and the comparison group were trending up prior to the implementation of the new GDL program.

In 2008, after GDL implementation, hospitalisation crashes as a percentage of licensed drivers attributed to the risk factor 'inattention / distraction' reduced by 25.4% for the target group. During the same period however, the comparison group also experienced a reduction of hospitalisation crashes as a percentage of licensed drivers of 9%.

While the preliminary data indicates the new GDL program has had a positive impact on reducing hospitalisation crashes, due to the reduction in the comparison group the entire decrease cannot be solely attributed to the new GDL program.

4.7 Risk factor: Tendency to Drive at High Risk Times

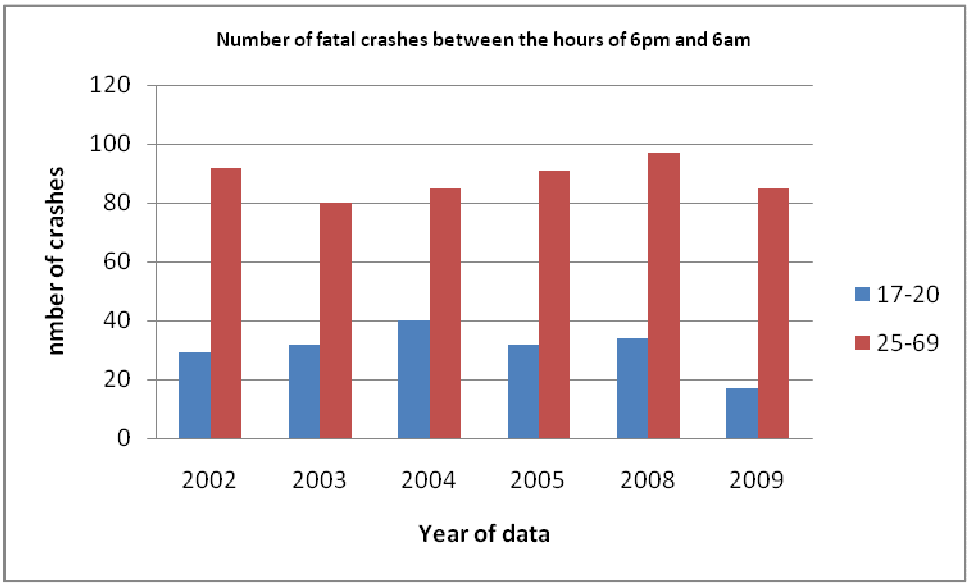
4.7.1 Contributing Circumstance: Crashes between the hours of 6pm and 6am

Data pertaining to crashes occurring between 6pm and 6am are displayed in Graph 4.57 to 4.60 and Table 4.35 and 4.36.

Table 4. 35: Fatal crashes: between the hours of 6pm and 6am

Number of Fatal Crashes from 6pm till 6am	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	29	170,407	0.0170	92	1,952,038	0.0047
2003	32	169,987	0.0188	80	2,007,546	0.0040
2004	40	167,117	0.0239	85	2,052,151	0.0041
2005	32	168,247	0.0190	91	2,100,795	0.0043
2008	34	187,393	0.0181	97	2,312,086	0.0042
2009	17	199,173	0.0085	85	2,388,047	0.0036

Graph 4. 57



Graph 4. 58

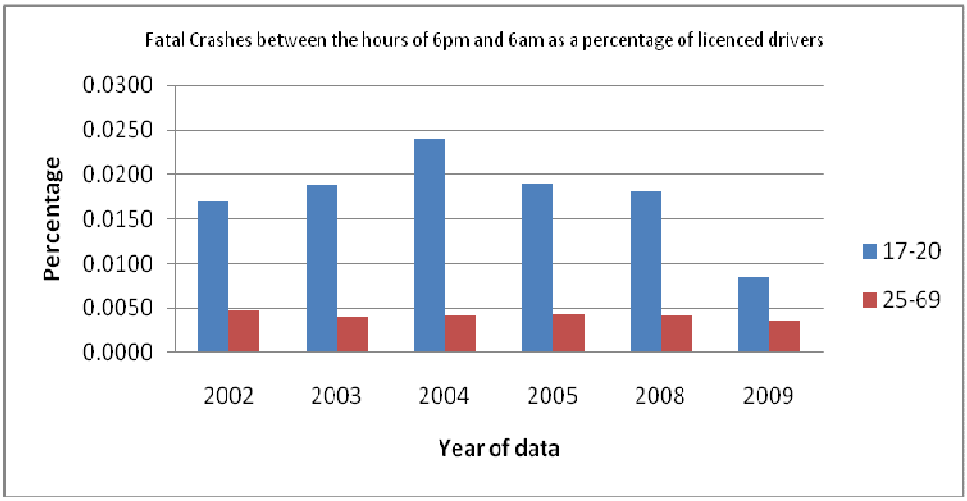
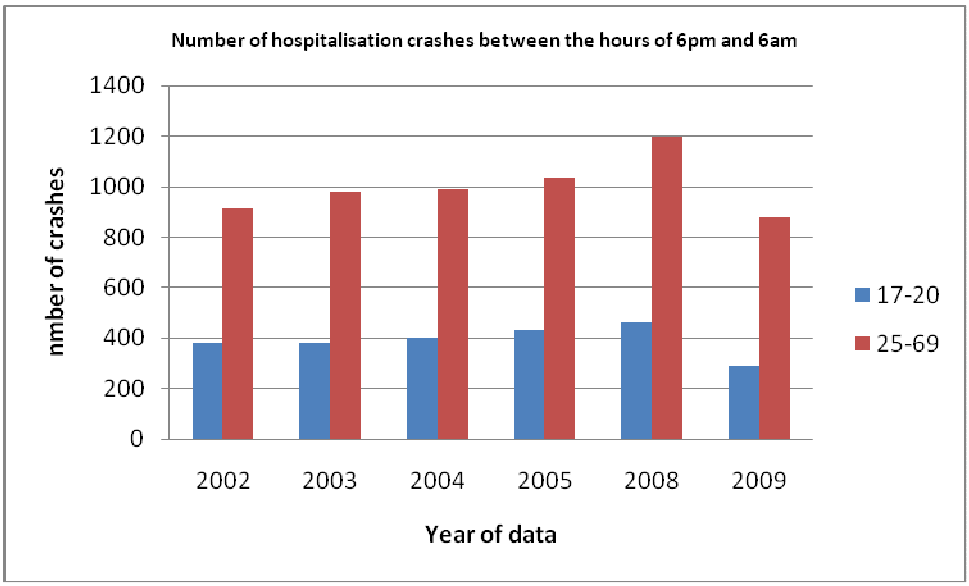


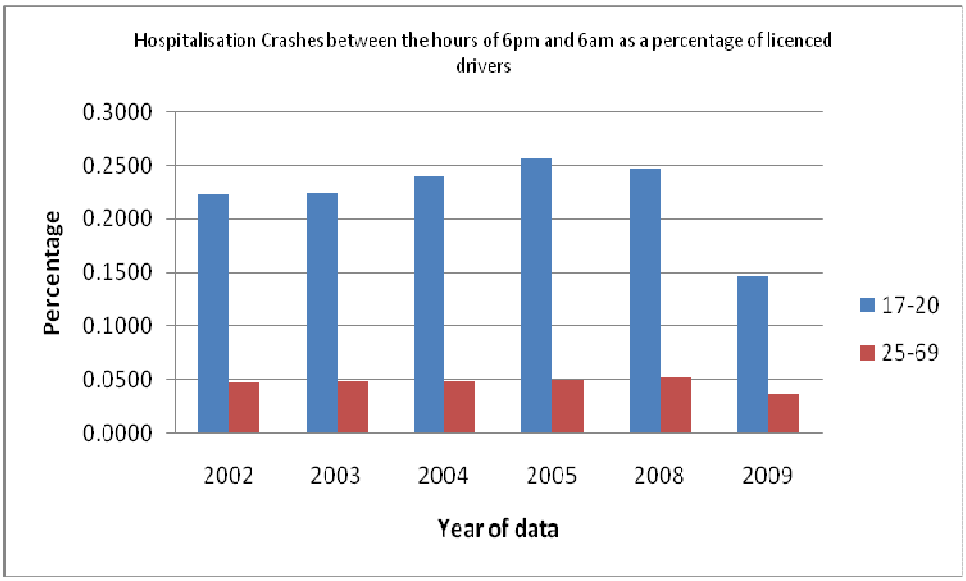
Table 4. 36: Hospitalisation crashes: between the hours of 6am and 6pm

Number of Hospitalised Crashes from 6pm till 6am	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	379	170,407	0.2224	915	1,952,038	0.0469
2003	382	169,987	0.2247	978	2,007,546	0.0487
2004	400	167,117	0.2394	992	2,052,151	0.0483
2005	431	168,247	0.2562	1035	2,100,795	0.0493
2008	462	187,393	0.2465	1200	2,312,086	0.0519
2009	291	199,173	0.1461	879	2,388,047	0.0368

Graph 4. 59



Graph 4. 60



As a percentage of licensed drivers, fatal crashes occuring between 6pm and 6am fell by 4.8% in 2008 from the 2005 total for 17 to 20 year olds. However, during the same period, fatal crashes reduced by 3.2% for the comparison group. Due to the similar reduction, the drop in fatal crashes cannot be attributed to the new GDL program.

The number of hospitalisation crashes increased post GDL for both the target group (17 to 20 years) and the comparison group. However as a percentage of licensed drivers, hospitalisation crashes for 17 to 20 year olds reduced after the implementation of the new GDL while the comparison group increased as a percentage of licensed drivers.

The reduction in hospitalisation crashes as a percentage of licensed drivers reduced by 3.9% for 17 to 20 year olds in 2008 from the 2005 total, breaking from an established upward trend. During the same period hospitalisation crashes as a percentage of licensed drivers increased for the comparison group by 5%.

4.7.2 Discussion for Risk Factor: Tendency to Drive at High Risk Times

It is acknowledged the new GDL program does little to address fatigue. However as mentioned earlier, Clarke, Ward and Truman (2005) suggests the reason for increased young driver crashes during darkness is caused by the purposes for which young drivers are on the road during these hours, not the time of day. They highlight increased young driver crashes during night time driving is not caused by darkness but rather the purpose for which young drivers are on the road during these hours and the manner in which they drive while there. These include driving for social purposes and driving for pleasure.

While the new GDL program in Queensland places no initial restrictions on the time of day young drivers can drive, unless enforced by a punitive good driving bond, it does place restrictions on passengers for P1 licence holders between 11pm and 5am on the next day. Additionally, the new GDL places restrictions on mobile phone use, both for young drivers and their passengers, and the type of vehicle young drivers are permitted to drive.

These and the other measures imposed under the new GDL program appear to have lead to a reduction in hospitalisation crashes for 17 to 20 year old drivers.

Hospitalisation crashes for 17 to 20 year olds, as a percentage of licensed drivers, reduced in 2008 by 3.9% from the 2005 total. During this same period, hospitalisation crashes as a percentage of licensed drivers increased by 5% for the control group. As the control group did not mirror the reductions shown for 17 to 20 year old drivers, it can be concluded the GDL program has contributed to the reduction in hospitalisation crashes.

Fatal crashes during this time period also reduced for 17 to 20 year olds, reducing by 4.8%. However the control group also experienced a reduction of 3.25% and therefore the reduction in fatal crashes cannot be attributed solely to the GDL program.

4.8 Risk Factor: Alcohol or Drugs

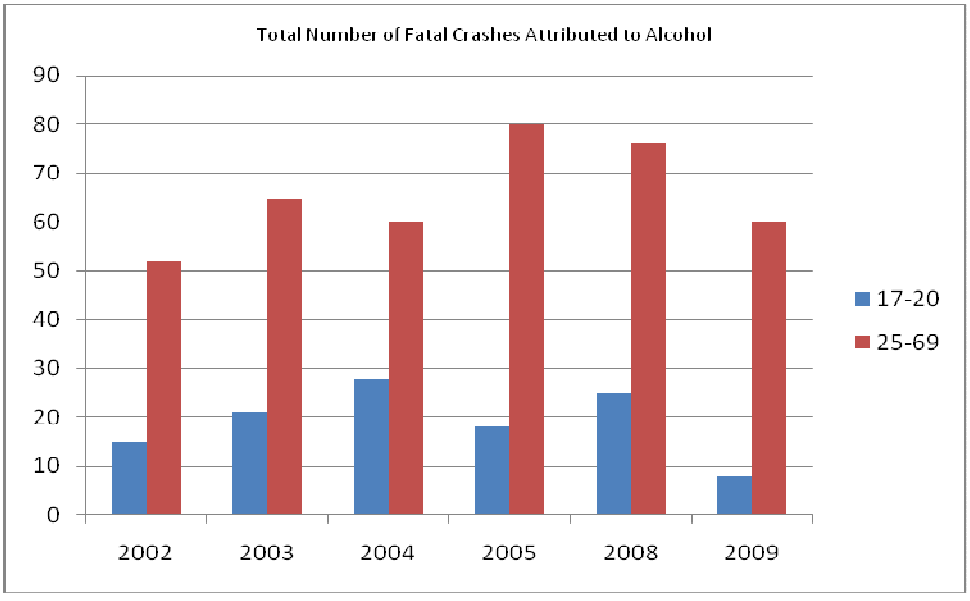
4.8.1 Contributing Circumstance: Alcohol Related

Data pertaining to alcohol related fatal and hospitalisation crashes is displayed in Graph 4.61 to 4.64 and Table 4.37 and 4.38.

Table 4. 37: Fatal crashes: Alcohol related

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	15	170,407	0.0088	52	1,952,038	0.0027
2003	21	169,987	0.0124	65	2,007,546	0.0032
2004	28	167,117	0.0168	60	2,052,151	0.0029
2005	18	168,247	0.0107	80	2,100,795	0.0038
2008	25	187,393	0.0133	76	2,312,086	0.0033
2009	8	199,173	0.0040	60	2,388,047	0.0025

Graph 4. 61



Graph 4. 62

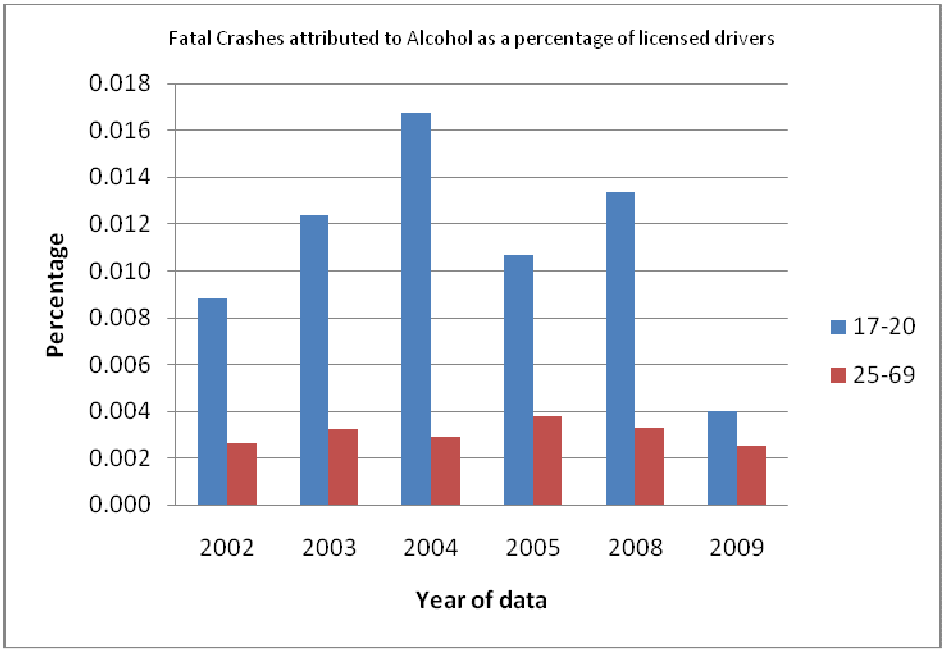
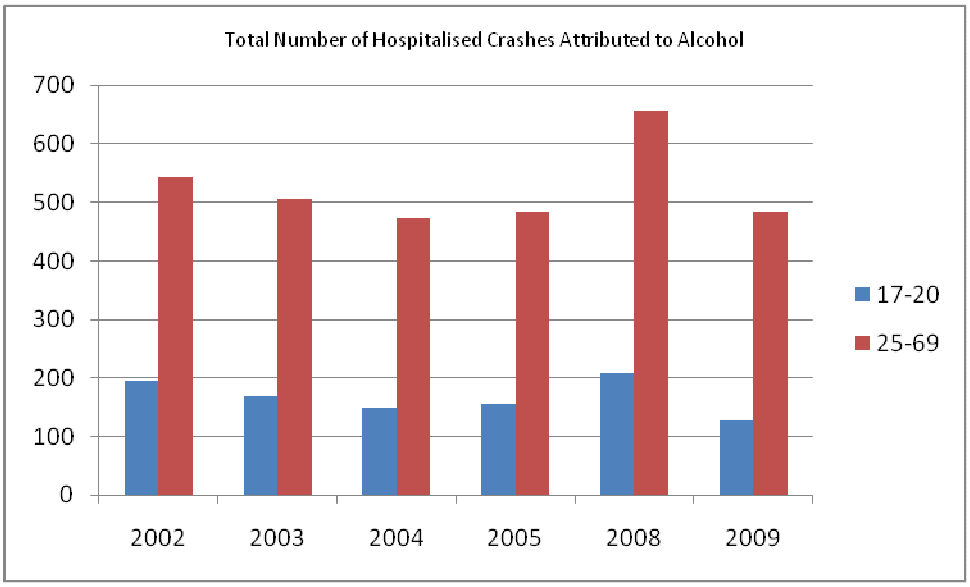


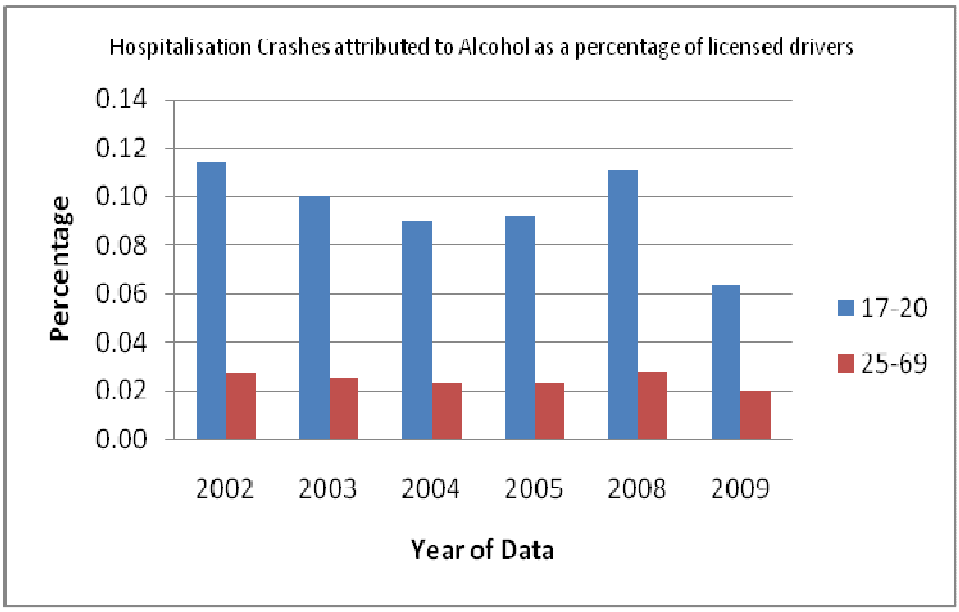
Table 4. 38: Hospitalisation crashes: Alcohol related

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	195	170,407	0.114	542	1,952,038	0.028
2003	170	169,987	0.100	506	2,007,546	0.025
2004	150	167,117	0.090	473	2,052,151	0.023
2005	155	168,247	0.092	485	2,100,795	0.023
2008	208	187,393	0.111	657	2,312,086	0.028
2009	127	199,173	0.064	485	2,388,047	0.020

Graph 4. 63



Graph 4. 64



Fatalities attributed to alcohol have fluctuated since the implementation of the new GDL program. In 2008, 25 fatalities were attributed to alcohol for 17 to 20 year olds, increasing from the 2005 toll of 18. As a percentage of licensed drivers this was a 19.8% increase. During the same period, the comparison group experienced a 15.8% decrease (see graph 4.55 and 4.56).

The 2009 fatalities attributed to alcohol, however, reduced significantly with only eight fatalities being reported for the target group (17 to 20 years). As a percentage of licensed drivers this was a 166% decrease from the 2005 total.

Like fatalities, hospitalisation rates attributed to alcohol for 17 to 20 year olds have also fluctuated, peaking in 2008 with 208 individuals admitted to hospital as a result of an alcohol related crash (see graph 4.57 and 4.58).

The 2008 data for both fatal and hospitalisation crashes is alarming. These crashes occurred after the implementation of the new GDL program and the significant increases indicate the new GDL program has had little impact on addressing crashes attributed to the risk factor of alcohol.

The alcohol restrictions in the new GDL program (0.00% blood alcohol limit for learner and provisional drivers) have actually been in operation for young drivers in Queensland since 1991 and it is acknowledged that there is no more that can be done regarding the blood alcohol limit, (0.00% is a low as one can go).

However, the increase in both fatal and hospitalisation crashes after the implementation of the new GDL program indicate more needs to be done. Additional punitive measures could be imposed within the GDL program leading to lengthy licence suspensions and heavy restrictions for all drivers on return to driving, i.e. mandatory alcohol vehicle locks, etc. Alternatively, the legal drinking age could be raised to reduce access to alcohol for young novice drivers.

The potential benefits, costs or impacts of these alternative programs are beyond the scope of this study and it is recommended that further research be conducted into alternative programs that aim to address alcohol related crashes not just for young drivers but for all drivers.

4.8.2 Contributing Circumstance: Drug Related

Data pertaining to drug related fatal and hospitalisation crashes is displayed in Graph 4.65 to 4.66 and Table 4.39 and 4.40.

Table 4. 39: Fatal crashes: Drug related

Number of Fatal Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	0	170,407	0.000	0	1,952,038	0.000
2003	0	169,987	0.000	0	2,007,546	0.000
2004	0	167,117	0.000	0	2,052,151	0.000
2005	0	168,247	0.000	0	2,100,795	0.000
2008	0	187,393	0.000	0	2,312,086	0.000
2009	0	199,173	0.000	0	2,388,047	0.000

Graph 4. 65

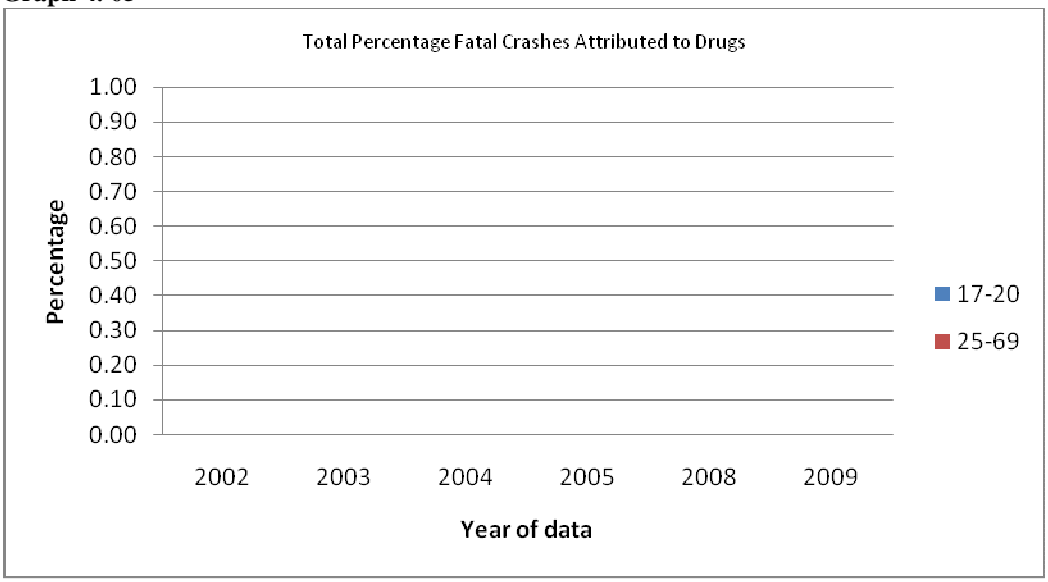
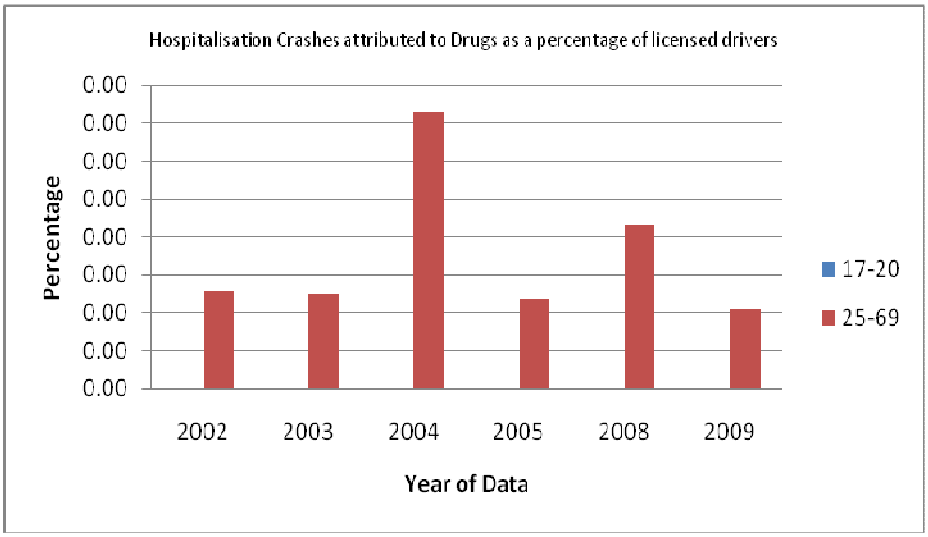


Table 4. 40: Hospitalisation crashes: Drug related

Number of Hospitalised Crashes	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	0	170,407	0.0000	1	1,952,038	0.0001
2003	0	169,987	0.0000	1	2,007,546	0.0000
2004	0	167,117	0.0000	3	2,052,151	0.0001
2005	0	168,247	0.0000	1	2,100,795	0.0000
2008	0	187,393	0.0000	2	2,312,086	0.0001
2009	0	199,173	0.0000	1	2,388,047	0.0000

Graph 4. 66



Web Crash data identifies no fatal crashes attributed to drugs for both the target group and the comparison group, (see graph 4.59).

Additionally, no hospitalisation crashes have been attributed to drugs for 17 to 20 year olds, (see graph 4.60).

Consequently, due to the limited data linking crashes to drugs, no conclusions can be reached regarding the impact the new GDL program has had on addressing drug taking and driving.

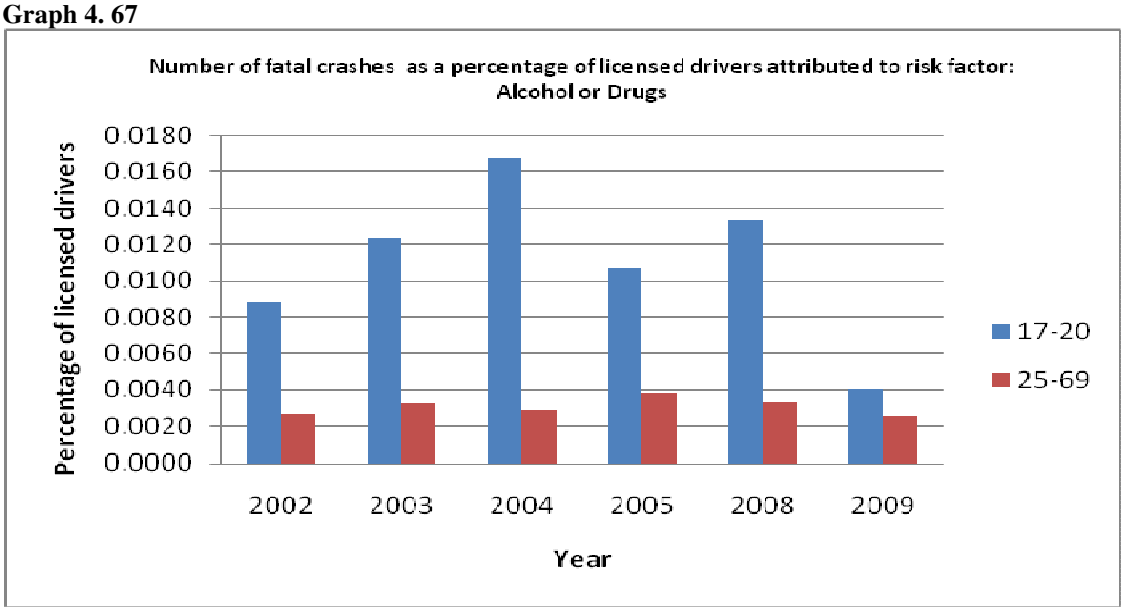
4.8.3 Discussion for Risk Factor: Alcohol or Drugs

Data for the contributing circumstances 'alcohol related' and 'drug related' has been combined to determine the overall impact the new GDL program has had on addressing the risk factor 'alcohol or drugs'. This data is contained in Table 4.41 and 4.42 and in Graph 4.67 and 4.68.

Table 4. 41: Fatal crashes: Risk factor – Alcohol or drugs

Number of Fatal Crashes (Risk Factor: Alcohol or Drugs)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	15	170,407	0.0088	52	1,952,038	0.0027
2003	21	169,987	0.0124	65	2,007,546	0.0032
2004	28	167,117	0.0168	60	2,052,151	0.0029
2005	18	168,247	0.0107	80	2,100,795	0.0038
2008	25	187,393	0.0133	76	2,312,086	0.0033
2009	8	199,173	0.0040	60	2,388,047	0.0025

Graph 4. 67

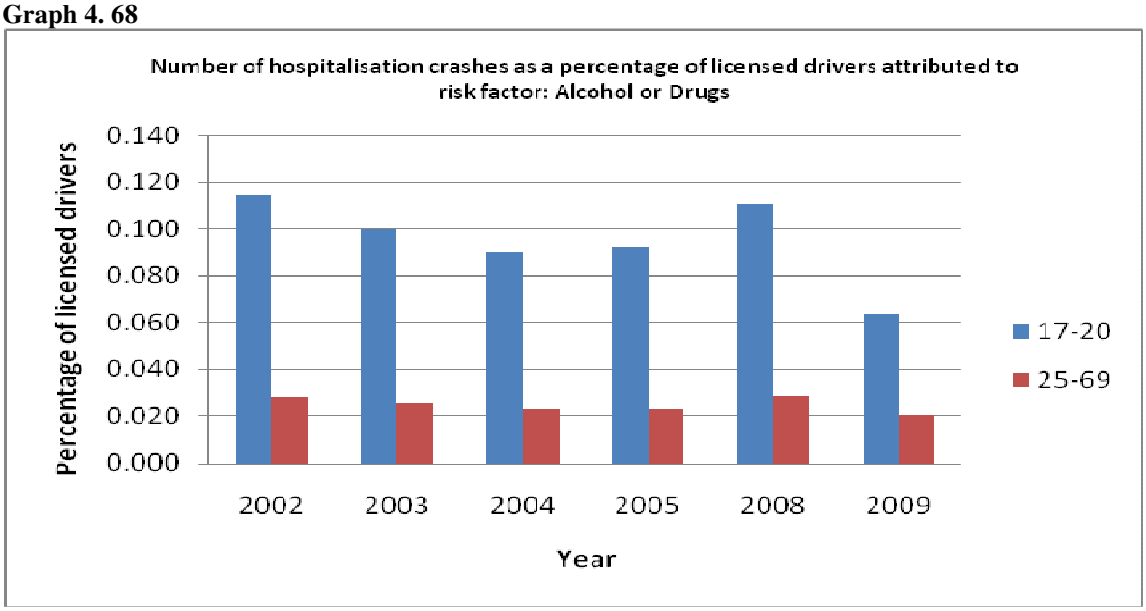


As no fatal crashes have been attributed to drugs for the years reviewed for both the target group (17 to 20 years) and the comparison group, the fatal data reported for the risk factor 'alcohol or drugs' is a repeat of that reported for alcohol alone.

Table 4. 42: Hospitalisation crashes: Risk factor – Alcohol or drugs

Number of Hospitalised Crashes (Risk Factor: Alcohol or Drugs)	17-20			25-69		
	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	195	170,407	0.114	543	1,952,038	0.028
2003	170	169,987	0.100	507	2,007,546	0.025
2004	150	167,117	0.090	476	2,052,151	0.023
2005	155	168,247	0.092	486	2,100,795	0.023
2008	208	187,393	0.111	659	2,312,086	0.029
2009	127	199,173	0.064	486	2,388,047	0.020

Graph 4. 68



As no hospitalisation crashes have been attributed to drugs for the years reviewed for the target group (17 to 20 years) and very few hospitalisation crashes have been attributed to drugs for the comparison group, the hospitalisation data reported for the risk factor 'alcohol or drugs' is almost idenitical to that reported for alcohol alone.

As mentioned in the discussion pertaining to the contributing circumstance 'alcohol related', the new GDL program has had little impact on addressing both fatal and hospitalisation crashes. The alcohol restrictions contained within the new GDL program have actually been in force since 1991 and it is recommended that further research be conducted to identify if harsher punitive measures or the raising of the legal age would lead to a reduction in young driver crashes attributed to alcohol and drugs.

4.9 Total Crashes

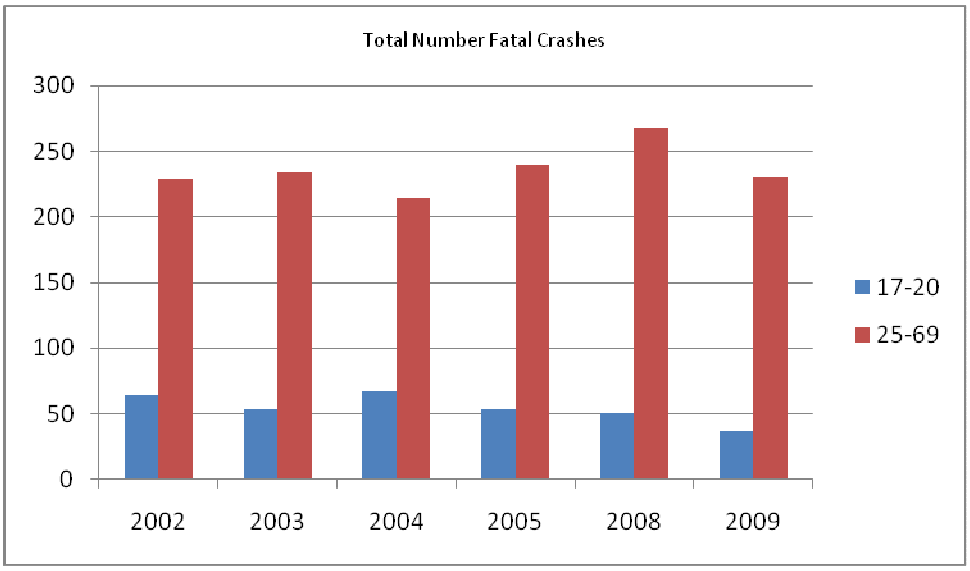
The total number of fatal and hospitalisation crashes recorded during the period under observation for both the target group and the comparison group is displayed in graph 4.69 to 4.72 and in tables 4.43 and 4.44.

4.9.1 Fatal Crashes

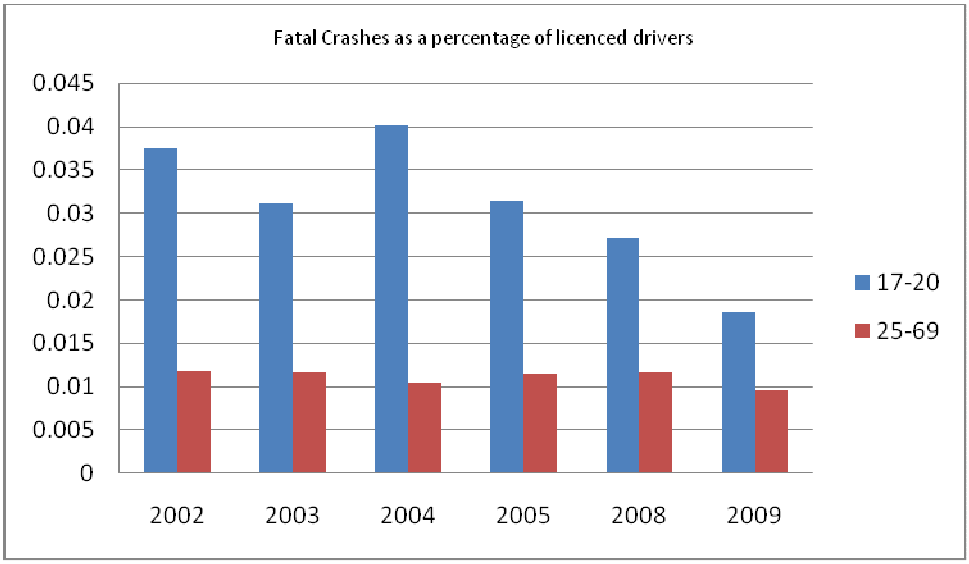
Table 4. 43

Total Number of Fatal Crashes	17-20			25-69		
Year	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	64	170,407	0.0376	229	1,952,038	0.0117
2003	53	169,987	0.0312	234	2,007,546	0.0117
2004	67	167,117	0.0401	214	2,052,151	0.0104
2005	53	168,247	0.0315	240	2,100,795	0.0114
2008	51	187,393	0.0272	268	2,312,086	0.0116
2009	37	199,173	0.0186	230	2,388,047	0.0096

Graph 4. 69



Graph 4. 70

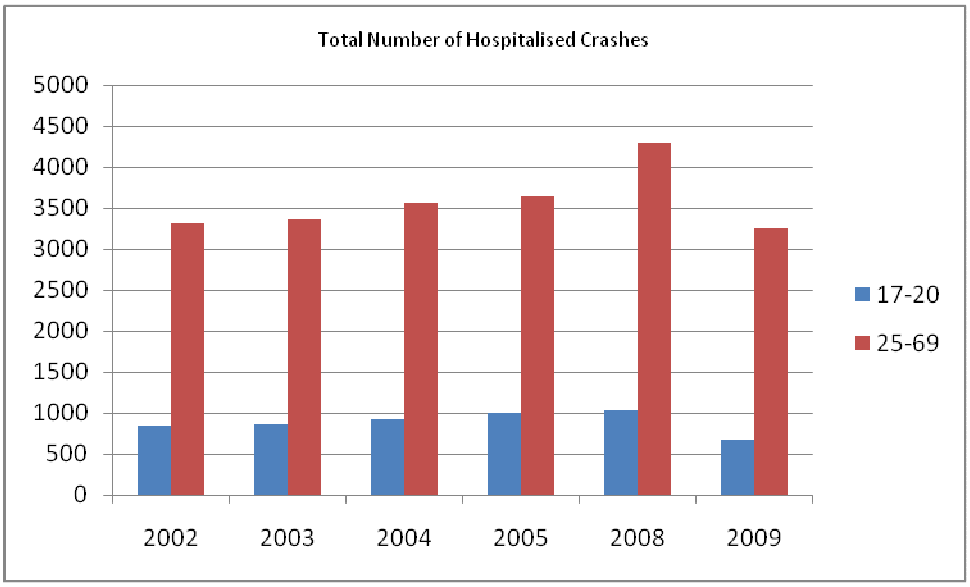


Fatal crashes for 17 to 20 year old drivers have reduced since the implementation of the new GDL program in 2007. However the number of fatalities for this target group have been adhering to a downward trend since 2004. While the comparision group does not adhere to this same trend it still indicates that any reduction in the number of fatal crashes can not be attributed solely to the new GDL program.

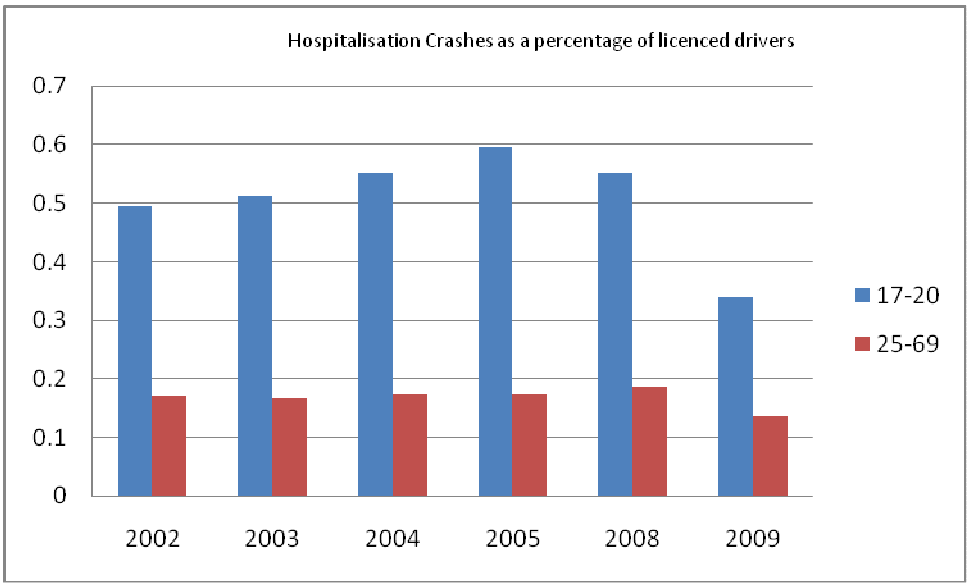
Table 4. 44

Total Number of Hospitalised Crashes	17-20			25-69		
Year	Total number	Number of licensed drivers	Percentage of licensed drivers	Total number	Number of licensed drivers	Percentage of licensed drivers
2002	844	170,407	0.495	3324	1,952,038	0.170
2003	870	169,987	0.512	3364	2,007,546	0.168
2004	922	167,117	0.552	3571	2,052,151	0.174
2005	1001	168,247	0.595	3639	2,100,795	0.173
2008	1035	187,393	0.552	4300	2,312,086	0.186
2009	677	199,173	0.340	3257	2,388,047	0.136

Graph 4. 71



Graph 4. 72



Prior to 2007, hospitalisation crashes for 17 to 20 year olds were adhering to an upward trend while the comparson group remained relatively constant as a percentage of licenced drivers. Post GDL implementation, the upward trend of hospitalisation crashes reversed for 17 to 20 year olds by 7.7% as a percentage of licenced drivers, while the comparison group increased by 6.86%. This preliminary data indicates the new GDL program has had a positive impact on reducing hospitalisation crashes.

5 Chapter 5: Conclusions

5.1 Introduction

The contributing circumstances are first established by police officers attending the scene. While these reports are reviewed and scrutinised before being authorised in Department of Transport and Main Roads data bases, it is acknowledged that some bias may present and that this bias may have had an impact on the outcomes of this analysis.

Additionally, it is acknowledged that some aspects of the new Queensland GDL licensing program were also requirements under the original licensing scheme. For example, the zero blood alcohol content for young learner and provisional licence holders and the extended probationary period for young novice drivers have been in force since 1991.

5.2 Conclusions

Preliminary data indicates the new GDL program implemented in Queensland in July 2007 has had little to no impact on addressing fatalities for 17 to 20 year old drivers. Reductions in fatal crashes post GDL have been recorded for the contributing circumstances:

- Fail to give way / stop (risk factor: less developed visual perception and cognitive skills),
- Undue care and attention (risk factor: inability to identify risk or hazards),
- Dangerous Driving (risk factor: overconfidence),
- Inattention (risk factor: inattention / distraction), and
- Crashes occurring between the hours of 6pm and 6am (risk factor: tendency to drive at high risk times).

However when this data is represented as identified risk factors, reductions in fatal crashes post GDL are only recorded for:

- Less developed visual perception and cognitive skills,
- Inattention / distraction,
- Overconfidence, and
- Tendency to drive at high risk times

There is insufficient evidence however to attribute any of these reductions to the new GDL program. This is further emphasised when total yearly fatalities are also looked at.

Since 2004, total fatal crashes for 17 to 20 year olds have trended downwards in both the number of recorded crashes and as a percentage of licenced drivers. While the continuation of this trend is positive with regards to young driver road safety it does not display any clear indication that the new GDL program is responsible for reducing young novice driver fatalities.

Like the fatality data, reductions in hospitalisation crashes as a percentage of licensed drivers has also been shown for several contributing circumstances. Those contributing circumstances are:

- Rain / wet road (risk factor: inexperience),
- Inexperience (risk factor: inexperience),
- Fail to give way / stop (risk factor: less developed visual perception and cognitive skills),
- Speed related (risk factor: deliberate risk taking),
- Illegal manoeurve (risk factor: inability to identify risks or hazards),

- Undue care and attention (risk factor: inability to identify risks or hazards),
- Dangerous driving (risk factor: overconfidence),
- Inattention (risk factor: inattention / distraction), and
- Crashes occurring between the hours of 6pm and 6am (risk factor: tendency to drive at high risk times).

When contributing circumstances data is converted to identified risk factors, reductions in hospitalisation crashes are recorded for:

- Inexperience,
- Less developed visual perception and cognitive skills,
- Deliberate risk taking,
- Inability to identify risks or hazards,
- Overconfidence,
- Inattention / distraction, and
- Tendency to drive at high risk times.

While the new GDL program has most likely contibuted to the reduction of hospitalisation crashes for these contributing circumstances and risk factors, due to reductions in the comparison group, the decreases cannot be attributed in all areas to the new GDL program alone.

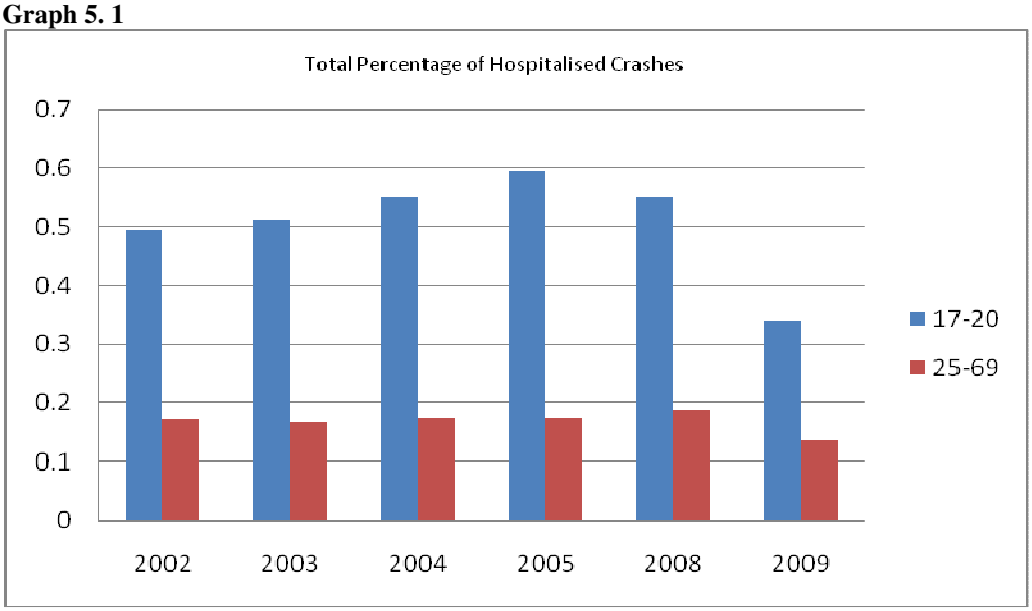
The available data does however indicate the new GDL program can be attributed for reductions in the following risk factors:

- Overconfidence (contributing circumstance: Dangerous driving),
- Less developed visual perception and cognitive skills (contributing circumstances: Fail to give way / stop and age (lack of perception)).
- Tendency to drive at high risk times (contributing circumstance: Crashes occurring between the hours of 6pm and 6am).

For these risk factors the hospitalisation crashes for the comparison group adhered to an upward trend both in the number of crashes and as a percentage of licensed drivers after implementation of the new GDL program. The target group (17 to 20 years), however, broke from the upward trend resulting in a reduction in crashes as a percentage of licensed drivers after implementation of the new GDL program.

The total number of hospitalisation crashes as a percentage of licensed drivers for the years under analysis further supports reductions that can be attributed to the new GDL program. As shown in graph 5.1, hospitalisation crashes as a percentage of licensed drivers reduced for 17 to 20 year olds in 2008 by 7.7% from the 2005 peak, while the comparison group increased by 6.8% in the same period.

Graph 5. 1



The available data indicates the new GDL program has had no effect at addressing crashes attributed to the following risk factor:

- Alcohol and Drugs

In 2008, hospitalisation crashes (as a percentage of licenced drivers) increased by 17% and fatal crashes increased by 19% for 17 to 20 year olds from the 2005 total. During the same period, fatal crashes reduced by 15.8% (as a percentage of licenced drivers) for the comparison group, however hospitalisation crashes did increase (18.7% as a percentage of licenced drivers).

The dramatic increases in fatal and hospitalisation crashes for 17 to 20 year olds indicate that the new GDL program has had little impact on addressing crashes attributed to alcohol. It is ackowledged that the alcohol restrictions contained within the new GDL program have actually been in force since 1991 and hence no new measures have really been implemented.

It is therefore recommended that the inclusion of lengthy licence suspensions for drink driving, the raising of the legal drinking age and harsh return to driving restrictions (i.e. breathalyser ignition locks) be investigated to determine the impact these measures could potentially have on not only reducing the number of crashes attributed to alcohol and drugs for 17 to 20 year olds, but for all drivers.

While the available data to date is positive with regards to reductions in hospitalisation crashes, it must be stressed that this is only a preliminary analysis and as mentioned earlier should not be taken as an indication of the ultimate success or failure of the new Queensland GDL program.

5.3 Further Research and Recommendations

As approved data is currently only available up to 2009, it can only be assumed that drivers aged 17 and 18 have completed all of the learner and P1 stages of the new GDL program. While some drivers aged 19 and 20 would also have completed all of these stages, most would not have as they would have obtained their provisional licence prior to June 2007. Even so, these drivers will still have been subjected to some of the restrictions imposed by the new GDL program and had to complete at least the P2 stage of licensing.

However, as not all participants have completed all stages of the program, it must be stressed that the results contained within this report are preliminary and are not a complete indication of the success or failure of the Queensland GDL program at addressing the identified young driver risk factors.

It is therefore recommended that the analysis of post GDL crash data be continued to include, at least, data up to 2012. Conducting the review through to this point will ensure that all drivers identified as young drivers aged between 17 and 20 would have completed all of the requirements of the GDL program.

6 References

Albanese A (Minister for Infrastructure, Transport, Regional Development and Local Government) 2008, *New National Road Death Statistics*, media release, 20th August, Department of Infrastructure, Transport and Regional Development, Canberra, viewed 10 February 2011, <http://www.minister.infrastructure.gov.au/aa/releases/2008/august/aa112_2008.htm >

Begg, D. Stephenson, S. 2003, 'Graduated driver licensing: the New Zealand experience', *Journal of Safety Research,* Vol. 34, p 99-105.

Chen. H., Senserrick. T., Martiniuk. A., Ivers. R., Boufous. S., Chang. H., Norton. R., 2010, Fatal crash trends for Australian young drivers 1997-2007: Geographic and socioeconomic differentials', *Journal of Safety Research,* Vol. 41 p123-128.

Chisholm, D. Naci, H. 2008, '*Road Traffic Injury Prevention: An assessment of risk exposure and intervention cost-effectiveness in different world regions,'* World Health Organisation, Department of Health Systems Financing, World Health Organisation, Geneva.

CIV3703 Transport Engineering. Study book 2010, University of Southern Queensland, Toowoomba.

Clarke D., Ward P., Truman W 2005, 'Voluntary risk taking and skill deficits in young driver accidents in the UK', *Accident Analysis & Prevention,* Vol. 37, issue 3, p523-529.

Clarke D., Ward P., Jones J. 1998, 'Overtaking road accidents: differences in manoeuvre as a function of driver age', *Accident Analysis & Prevention,* Vol. 37, p 523-529.

Commission for Children and Young People and Child Guardian 2006, *Annual Report Deaths of Children and Young People Queensland 2005-2006*, Queensland Government, Brisbane.

Commission for Children and Young People and Child Guardian 2006, *Submission to Queensland Transport on the policy proposals contained in the discussion paper: Queensland youth: on the road and in control',* Queensland Government, Brisbane.

Department of Infrastructure, Energy and Resources 2009a, '*Novice: What's next'*, Tasmanian Government, viewed 15th March 2011, <http://www.transport.tas.gov.au/novice/pre_learner/car/whats_next >

Department of Infrastructure, Energy and Resources 2009b, '*Novice: Your L1 Log Book'*, Tasmanian Government, viewed 15th March 2011, <http://www.transport.tas.gov.au/novice/l1/car/your_l1_log_book >

Department of Infrastructure, Energy and Resources 2009c, '*Novice: Car L2 Stage'*, Tasmanian Government, viewed 15th March 2011, < http://www.transport.tas.gov.au/novice/l2/car >

Department of Transport 2003, *'Queensland Road Safety Strategy 2004-2011: Safe4life*,' Queensland Government, Brisbane.

Department of Main Roads 2004, *Road Panning and Design Manual: Chapter 5: Traffic Parameters and Human Factors*, Queensland Government, Brisbane.

Department of Transport 2005, *Queensland Youth: on the road and in control a discussion of ways to improve young driver safety*, Queensland Government, Brisbane.

Department of Transport and Main Roads 2009a, *2004 Road Traffic Crashes in Queensland*, Queensland Government, Brisbane.

Department of Transport and Main Roads 2009b, *Avoid becoming distracted while driving,* 17th December, Queensland Government, Brisbane, viewed 2nd February 2011, <http://tmrintranet/Our-organisation/Newsroom/Previous-stories/Avoid-becoming-distracted-while-driving.aspx>

Department of Transport and Main Roads 2009c, *'Driver Education for Senior School students (Years 10 – 12) and young novice drivers: Literature Review and key elements of a best practice program*, Queensland Government, Brisbane.

Department of Transport and Main Roads 2010a, '*Learner Licence'*, Queensland Government, viewed 15th March 2011, <http://www.tmr.qld.gov.au/Licensing/Getting-a-licence/Car-licence/Learner-licence.aspx >

Department of Transport and Main Roads 2010b, '*Provisional Licence'*, Queensland Government, viewed 15th March 2011, < http://www.tmr.qld.gov.au/Licensing/Getting-a-licence/Car-licence/Provisional-licence.aspx >

Department of Transport and Main Roads 2010c, '*Restrictions'*, Queensland Government, viewed 15th March 2011, < http://www.tmr.qld.gov.au/Licensing/Getting-a-licence/Car-licence/Restrictions.aspx >

Department of Transport and Main Roads 2010d, '*Late Night Driving Restrictions'*, Queensland Government, viewed 15th March 2011, < http://www.tmr.qld.gov.au/Licensing/Getting-a-licence/Car-licence/Restrictions/Late-night-driving.aspx >

Department for Transport, Energy and Infrastructure 2011a, '*My Licence – P1 Plater',* Government of South Australia, viewed 15th March 2011, <http://www.mylicence.sa.gov.au/p1_plater >

Department for Transport, Energy and Infrastructure 2011b, '*My Licence – L Plater',* Government of South Australia, viewed 15th March 2011, < http://www.mylicence.sa.gov.au/l_plater >

Department for Transport, Energy and Infrastructure 2011c, '*My Licence – P2 Plater',* Government of South Australia, viewed 15th March 2011, <http://www.mylicence.sa.gov.au/p1_plater >

Doherty S., Andrey J. 1997,'Young drivers and graduated licensing: The Ontario case', *Transportation*, Vol. 24, p227-251.

Emgstrom I., Gregersen N., Granstron K., Nyberg A. 2008, 'Young drivers – Reduced crash risk with passengers in the vehicle', *Accident Analysis and Prevention,* Vol. 40, p 341-348.

Excel Drive 2009, '*Graduated Licensing System'*, Excel Drive, viewed 6th March 2011, <http://www.exceldrive.com/grad_licensing_nsw.html>

Ferguson S.A, 2003, 'Other high-risk factors for young drivers – how graduated licensing does, doesn't, or could address them', *Journal of Safety Research,* Vol. 34, p 71-77.

Foss R.D 2007, 'Improving graduated driver licensing systems: A conceptual approach and its implications', *Journal of Safety Research,* Vol. 38, p185-192.

Giles M 2004, 'Driver speed compliance in Western Australia: a multivariate analysis', *Transportation Research,* Vol.11, p 227-235.

Hasselberg M., Laflamme L. 2009, 'How do car crashes happen among young drivers aged 18-20 years? Typical circumstances in relation to licence status, alcohol and injury consequences', *Accident Analysis and Prevention,* Vol. 41 p734-738.

Hedlund J., Shults R., Compton R. 2003, 'What we know, what we don't know, and what we need to know about graduated driver licensing', *Journal of Safety Research,* Vol. 37, p107-121.

Hedlund J., Shults R., Compton R. 2006, 'Graduated driver licensing and teenage driver research in 2006', *Journal of Safety Research,* Vol. 37, p107-121.

Hedlund J. 2007, 'Novice teen driving: GDL and beyond', *Journal of Safety Research,* Vol. 38, p259-266.

Institute of Transportation Engineers 2009, '*Before and After Study: Technical Brief*', Transport Safety Council, Washington DC

Keall M. D. Newstead S (2011), 'Passenger vehicle safety in Australasia for different driver groups', *Accident Analysis and Prevention,* Vol. 43, p 684-689.

Kingham S., Pearce J., Dorling D., Faulk M. 2008, 'The impact of the graduated licence scheme on road traffic accident youth mortality in New Zealand', *Journal of Transport Geography*, Vol. 16, p 134-141.

Lee J. 2007 'Technology and teen drivers ', *Journal of Safety Research,* Vol. 38 p203-213.

Lewis-Evans Ben 2010, 'Crash involvement during the different phases of the New Zealand Graduated Driver Licensing System (GDLS)', *Journal of Safety Research,* Vol. 41, p 359-365.

McKnight J., McKnight S. 2003, 'Young novice drivers: careless or clueless?' *Accident Analysis & Prevention,* Vol. 35, p921-925.

Machin A. M., Sankey S. K. 2008, 'Relationship between young drivers' personality characteristics, risk perceptions, and driving behaviour,' *Accident Analysis & Prevention,* Vol. 40, p 541-547.

Males M. 2007, 'California's graduated driver license law: Effect on teenage drivers' deaths through 2005', *Journal of Safety Research,* Vol. 38, p 651-659.

Mandic P., Ridgeway G. 2010, 'Behavioural impact of graduated driver licensing on teenage driving risk and exposure', *Journal of Health Economics,* Vol. 29 p48-61.

Monash University Accident Research Centre 2005, '*Young Driver Research Program: An evaluation of the Australian Graduated Licensing Scheme*', Federal Office of Road Safety, viewed 5th March 2011, <http://www.monash.edu.au/muarc/reports/atsb136.html>

Morrisey M., Grabowski D., Dee T., Campbell C. 2006,'The strength of graduated drivers license programs and fatalities among teen drivers and passengers', *Accident Analysis and Prevention,* Vol. 38 p135-141.

Motor Vehicle Registry Fact Sheet 2007, '*Graduated Driver Licensing Phase 1: The Facts'*, Northern Territory Government, viewed 15th March 2011, <http://www.nt.gov.au/transport/mvr/licensing/publications/gdlfacts.pdf >

Motor Vehicle Registry 2009, '*L1 – How to obtain a Class C or Class R Learner Licence'*, Northern Territory Government, viewed 15th March 2011, <http://www.nt.gov.au/transport/mvr/licensing/infobulletins/ibl01.pdf >

Northern Territory Transport Group 2010a, '*Driver Training and Licensing'*, Northern Territory Government, viewed 15th March 2011, <http://www.nt.gov.au/transport/mvr/dtal/index.shtml >

Northern Territory Transport Group 2010b, '*Driver Training and Licensing: About DTAL'*, Northern Territory Government, viewed 15th March 2011, <http://www.nt.gov.au/transport/mvr/dtal/detail/theory1.shtml >

Norton R., Hyder A., Peden M. 2001, 'The Epidemiology of Road Traffic Injuries: What Exists, Gaps and the Role of Public Health', *Proceedings of WHO Meeting to Develop a 5 year Strategy for Road Traffic Injury Prevention*, World Health Organisation, Geneva.

Opiela K., Sant B., Childers J. 2006, 'Turning Young Drivers into Survivors', *Public Roads*, Vol. 70 Issue 2 p3-31.

Ouimet M., Simons-Morton B., Zador P., Lerner N., Freedman M., Duncan G., Wang J. 2010, 'Using the U.S. National Household Travel Survey to estimate the impact of passenger characteristics on young drivers' relative risk of fatal crash involvement', *Accident Analysis and Prevention,* Vol. 42, p 689-694.

Prato C., Toledo T., Lotan T., Taubman O., Ari B. 2010,'Modeling the behaviour of novice young drivers during the first year after licensure', *Accident Analysis and Prevention,* Vol. 42 p480-486.

RACQ, 2003, '*Submission to Travelsafe Committee: Reducing the road toll for young Queenslanders – is education enough?',* Royal Automobile Club of Queensland, Brisbane.

Rhodes N., Brown D., Edison A. 2005, 'Approaches to understanding young driver risk taking', *Journal of Safety Research: Traffic Records Forum Proceedings,* Vol. 36 p 497-499.

Road Transport Authority 2010a, '*Learner Licence',* Territory and Municipal Service, A.C.T. Government, viewed 15th March 2011, <http://www.rego.act.gov.au/licensing/licencelearner.htm >

Road Transport Authority 2010b, '*Provisional Licence',* Territory and Municipal Service, A.C.T. Government, viewed 15th March 2011, <http://www.rego.act.gov.au/licensing/licenceprovisional.htm>

Scott-Parker B., Watson B., King M. 2009, 'Understanding the psycholosocial factors influencing the risky behaviour of young drivers',*Transportation Research,* Part F 12, p 470-482.

Shope J., Molnar L. 2003, 'Graduated driver licensing in the United States: evaluation results from the early programs', *Journal of Safety Research,* Vol. 37, p107-121.

Shope J., Molnar L. 2004, 'Michigan's graduated driver licensing program: Evaluation of the first four years', *Journal of Safety Research,* Vol. 35, p337-344.

Sibley C., Harre N. 2009, 'The impact of driver styles of traffic safety advertisement on young drivers' explicit and implicit self-enhancement biases', *Transportation Research,* Part F 12, p 159- 167.

Simons-Morton B., Lerner N., Singer J. 2005, 'The observed effects of teenage passengers on the risky driving behaviour of teenage drivers', *Accident Analysis and Prevention,* Vol. 37, issue 6, p 973-982.

Tay R. 2005, 'The Effectiveness of Enforcement and Publicity Campaigns on Serious Crashes Involving Young Male Drivers: Are Drinking and Speeding Similar?' *Accident Analysis & Prevention,* Vol. 37, p 922-929.

The Motor Report (TMR) 2010, '*Don't be a dickhead: New Vic Roads Online Campaign Targets Young Drivers*', The Motor Report, viewed 5th March 2011, <http://www.themotorreport.com.au/50087/dont-be-a-dickhead-new-vicroads-online-campaign-targets-young-drivers>

The Association of Independent Schools 2000, '*Road Safety Matters: A new Graduated Licence Program for NSW*', The Association of Independent Schools, viewed 6th March 2011, <http://www.studentnet.edu.au/aispd/newsletters/newsletters/archive/term4-00/rsm.pdf>

Transport Roads and Traffic Authority 2007, '*Licence Tests'*, New South Wales Government, viewed 6th March 2011, <http://www.rta.nsw.gov.au/licensing/tests/index.html>

Transport Roads and Traffic Authority 2010a, '*Provisional (P1) Drivers Licence'*, New South Wales Government, viewed 6th March 2011, <http://www.rta.nsw.gov.au/licensing/gettingalicence/car/learners/index.html>

Transport Roads and Traffic Authority 2010b, '*Provisional (P2) Drivers Licence: How do I get my P2 licence'*, New South Wales Government, viewed 6th March 2011, <http://www.rta.nsw.gov.au/licensing/gettingalicence/car/provisional_p2.html >

Transport Roads and Traffic Authority 2011, '*Learner Licence'*, New South Wales Government, viewed 6th March 2011, <http://www.rta.nsw.gov.au/licensing/gettingalicence/car/learners/index.html>

Twisk D., Stacey C. 2007, 'Trends in young driver risk and countermeasures in European countries', *Journal of Safety Research,* Vol. 38, p245-257.

Ulleberg P., Rundmo T. 2003, 'Personality, attitudes and risk perception as predictors of risky driving behaviour among young drivers', *Safety Science*, Vol. 41, p 427-443.

Vassallo S., Smart D., Sanson A., Harrison W., Harris A., Cockfield S., McIntyre A. 2007, 'Risky driving among young Australian drivers: Trends, precursors and correlates, '*Accident Analysis & Prevention,* Vol. 39 p 444-458.

Vic Roads 2010, '*Victorias Graduated Licensing System*', State Government of Victoria, viewed 5th March 2011, <http://vicroads.vic.gov.au/Home/SafetyAndRules/SaferDrivers/YoungAndNewDrivers/VictoriasNewGraduatedLicensingSystem.htm>

Western Australian Department of Transport 2010a, '*Driver Training and Licensing'* , Government of Western Australia, viewed 15th March 2011, <http://www.transport.wa.gov.au/licensing/20653.asp >

Western Australian Department of Transport 2010b, '*Novice Drivers (includes L & P platers)'*, Government of Western Australia, viewed 15th March 2011, < http://www.transport.wa.gov.au/licensing/20424.asp >

Whissell R. W., Bigelow B. J. 2003, 'The Speeding Attitude Scale and the Role of Sensation Seeking in Profiling Young Drivers at Risk', *Risk analysis*, Vol. 23, No. 4, pages 811 – 820.

Williams A. F. 2006, 'Young Driver Risk Factors: Successful and Unsuccessful Approaches for Dealing with Them and an Agenda for the Future'*, Injury Prevention*, viewed 31st January 2011. <http://www.injuryprevention.bmj.com>

Williams A. F. 2007, 'Contribution of the components of graduated licensing to crash reductions'*, Journal of Safety Research,* Vol. 38, p177-184.

Williams A., Shults R. 2010, 'Graduated Driver Licensing Research, 2007 – Present: A Review and Commentary', *Journal of Safety Research,* Vol. 41, p77-84.

World Health Organisation (WHO) 2000, *Transport, environment and health*, World Health Organisation Regional Office for Europe, Copenhagen.

World Health Organisation (WHO) 2004, *Prevention: World report on road traffic injury prevention*, World Health Organisation, Geneva.

World Health Organisation (WHO) 2006, *Road Safety is No Accident: First United Nations Global Safety Week*, World Health Organisation, Geneva.

World Health Organisation (WHO) 2007, *Youth and Road Safety*, World Health Organisation, Geneva.

World Health Organisation (WHO) 2009, *Mortality From Road Traffic Injuries in Children and Young People: Fact Sheet 2.1*, World Health Organisation Europe, Geneva.

World Health Organisation (WHO) 2010, '*Data systems: A Road Safety Manual for Decision Makers - Chapter 4*: *Using data to improve road safety',* World Health Organisation Europe, Geneva, viewed 16th March 2011, <http://whqlibdoc.who.int/publications/2010/9789241598965_eng_Chapter4.pdf >

Youth Central 2010, '*On your P's'*, State Government of Victoria, Department of Planning and Community Development, viewed 5th March 2011, <http://www.youthcentral.vic.gov.au/Travel+&+Transport/Learning+to+drive/On+your+Ps/>

7 Appendix A: Queensland Drivers Licence Holders 2004-2010

Source: Queensland Department of Transport and Main Roads

Queensland Current Driver Licences as at November 2002							
	Learners		Open		Provisional		Total
	Male	Female	Male	Female	Male	Female	
16 yrs	6,589	5,172	0	0	2	3	**11,766**
17 yrs	8,647	9,731	12	6	11,091	7,858	**37,345**
18 yrs	4,983	6,558	63	60	17,031	14,022	**42,717**
19 yrs	3,450	5,054	411	362	19,372	17,164	**45,813**
20 yrs	2,490	3,631	8,735	7,253	11,371	11,052	**44,532**
17yrs - 20 yrs	19,570	24,974	9,221	7,681	58,865	50,096	170,407
21yrs - 24yrs	5,620	8,501	65,954	63,738	17,288	15,229	**176,330**
25yrs - 29yrs	3,351	5,380	111,269	108,297	4,532	2,857	**235,686**
30yrs - 39yrs	2,767	5,288	255,212	249,152	4,493	2,580	**519,492**
40yrs - 49yrs	982	2,218	257,788	250,187	2,797	1,256	**515,228**
50yrs - 59yrs	419	748	224,492	203,754	1,444	411	**431,268**
60yrs - 69yrs	177	205	137,034	112,428	431	89	**250,364**
						Total licenced drivers age 25 - 69	**1,952,038**
70yrs - 74yrs	33	24	48,734	36,215	63	12	**85,081**
75yrs and above	22	14	60,616	37,871	34	3	**98,560**
Unknown	3	1	2	0	4	4	**14**
Total	**59,103**	**77,499**	**1,179,543**	**1,077,004**	**148,818**	**122,636**	**2,664,603**

QUEENSLAND CURRENT DRIVERS' LICENCES AS AT DECEMBER 2003

Age Group	LEARNERS		OPEN		PROVISIONAL		
	Male	Female	Male	Female	Male	Female	TOTAL
16 yrs	6,460	5,294	1	1	0	0	**11,756**
17 yrs	8,819	9,529	4	7	10,550	7,563	**36,472**
18 yrs	4,880	6,206	58	32	17,163	14,308	**42,647**
19 yrs	3,134	4,514	210	156	19,169	17,198	**44,381**
20 yrs	2,503	3,765	9,482	7,874	11,441	11,422	**46,487**
17yrs - 20 yrs	19,336	24,014	9,754	8,069	58,323	50,491	169,987
21 yrs - 24 yrs	5,787	8,815	70,131	66,232	15,482	15,077	**181,524**
25 yrs - 29 yrs	3,189	5,496	110,059	107,703	4,673	3,095	**234,215**
30 yrs - 39 yrs	2,899	5,442	257,625	252,852	4,929	2,681	**526,428**
40 yrs - 49 yrs	1,069	2,317	264,351	257,710	2,914	1,471	**529,832**
50 yrs - 59 yrs	475	809	233,076	213,590	1,567	528	**450,045**
60 yrs - 69 yrs	191	218	145,052	120,951	501	113	**267,026**
						Total licenced drivers age 25 - 69	**2,007,546**
70 yrs - 74 yrs	39	21	49,435	37,306	70	19	**86,890**
75 yrs and over	26	11	66,433	42,669	33	5	**109,177**
Unknown	1	1	4	0	2	3	**11**
TOTAL	**58,808**	**76,452**	**1,215,675**	**1,115,152**	**146,817**	**123,974**	**2,736,878**

QUEENSLAND CURRENT DRIVERS' LICENCES AS AT 31 DECEMBER 2004

Age	LEARNERS		OPEN		PROVISIONAL		Total
	Male	Female	Male	Female	Male	Female	
16 yrs	6,222	5,256	0	0	0	0	**11,478**
17 yrs	8,465	8,935	3	4	10,720	7,854	**35,981**
18 yrs	4,494	6,051	53	29	17,115	14,338	**42,080**
19 yrs	2,927	4,282	201	137	19,314	17,346	**44,207**
20 yrs	2,287	3,380	8,914	7,265	11,252	11,751	**44,849**
17yrs - 20 yrs	18,173	22,648	9,171	7,435	58,401	51,289	167,117
21 yrs - 24yrs	5,626	8,823	73,736	68,172	14,697	15,749	**186,803**
25yrs - 29yrs	3,258	5,488	108,721	106,844	4,753	3,217	**232,281**
30yrs - 39yrs	2,957	5,539	260,180	255,533	5,284	2,726	**532,219**
40yrs - 49yrs	1,040	2,506	269,267	262,400	2,860	1,392	**539,465**
50yrs - 59yrs	491	889	239,364	221,801	1,495	523	**464,563**
60yrs - 69yrs	202	232	153,418	129,182	492	97	**283,623**
						Total licenced drivers age 25 - 69	**2,052,151**
70yrs - 74yrs	41	27	50,196	38,703	77	9	**89,053**
75yrs and above	21	9	66,776	43,717	36	4	**110,563**
Unknown			3	0	2	2	**7**
TOTAL	**56,204**	**74,065**	**1,240,003**	**1,141,222**	**146,498**	**126,297**	**2,784,289**

QUEENSLAND CURRENT DRIVERS' LICENCES AS AT 31 DECEMBER 2005

Age	LEARNERS		OPEN		PROVISIONAL		Total
	Male	Female	Male	Female	Male	Female	
16 yrs	6,567	5,575	0	0	1	0	**12,143**
17 yrs	8,787	9,287	9	5	11,058	8,270	**37,416**
18 yrs	4,555	5,732	49	34	17,072	14,421	**41,863**
19 yrs	2,799	4,150	176	157	19,175	17,407	**43,864**
20 yrs	2,153	3,246	9,119	7,674	11,330	11,582	**45,104**
17yrs - 20 yrs	18,294	22,415	9,353	7,870	58,635	51,680	168,247
21yrs - 24yrs	5,380	8,594	75,127	70,064	15,113	16,369	**190,647**
25yrs - 29yrs	3,215	5,473	109,242	107,506	5,210	3,412	**234,058**
30yrs - 39yrs	2,988	5,695	262,773	258,330	5,665	3,149	**538,600**
40yrs - 49yrs	1,061	2,533	273,003	266,418	3,199	1,574	**547,788**
50yrs - 59yrs	494	958	245,695	229,252	1,533	582	**478,514**
60yrs - 69yrs	188	250	162,411	138,379	491	116	**301,835**
						Total licenced drivers age 25 - 69	**2,100,795**
70yrs - 74yrs	37	29	51,104	39,901	61	10	**91,142**
75yrs and above	18	14	68,622	45,933	44	12	**114,643**
Unknown	0	0	2	0	0	0	**2**
TOTAL	**38,242**	**51,536**	**1,257,332**	**1,163,653**	**89,952**	**76,904**	**2,677,619**

QUEENSLAND CURRENT DRIVERS' LICENCES AS AT 31 DECEMBER 2008

Age Group	LEARNERS		OPEN		PROVISIONAL		P1		P2		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
16 yrs	17,116	16,201	0	0	0	0	0	0	0	0	**33,317**
17 yrs	13,320	13,566	15	9	17	12	9,479	7,346	14	8	**43,786**
18 yrs	5,762	6,414	118	65	4,660	3,525	9,932	9,169	4,083	3,906	**47,634**
19 yrs	3,590	4,628	365	262	16,013	14,005	3,085	3,621	899	1,230	**47,698**
20 yrs	2,583	3,585	10,029	8,472	9,932	9,392	1,424	2,019	293	546	**48,275**
17yrs - 20 yrs	25,255	28,193	10,527	8,808	30,622	26,934	23,920	22,155	5,289	5,690	187,393
21yrs - 24yrs	6,371	9,773	81,447	74,983	12,813	11,770	2,393	3,647	414	904	**204,515**
25yrs - 29yrs	4,303	7,360	126,871	121,053	5,037	1,840	256	368	1,295	1,817	**270,200**
30yrs - 39yrs	3,761	7,344	281,337	275,034	5,408	1,412	0	0	1,324	1,804	**577,424**
40yrs - 49yrs	1,418	3,251	291,343	283,104	3,170	1,121	0	0	495	641	**584,543**
50yrs - 59yrs	657	1,331	259,926	247,791	1,617	431	0	0	189	159	**512,101**
60yrs - 69yrs	213	338	195,131	171,332	588	117	0	0	60	39	**367,818**
										Total licenced drivers age 25 - 69	**2,312,086**
70yrs - 74yrs	42	41	58,422	47,639	73	5	0	0	5	5	**106,232**
75yrs and above	24	17	81,017	56,754	47	8	0	0	5	1	**137,873**
Total	**84,415**	**102,042**	**1,396,548**	**1,295,306**	**89,997**	**70,572**	**50,489**	**48,325**	**14,365**	**16,750**	**5,480,895**

QUEENSLAND CURRENT DRIVER LICENCES AS AT 31 DECEMBER 2009

Age Group	LEARNERS		OPEN		PROVISIONAL		P1		P2		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
16 yrs	18,964	17,851	0	0	0	0	1	0	0	0	**36,816**
17 yrs	15,308	15,485	12	8	1	0	9,218	7,800	26	14	**47,872**
18 yrs	9,107	10,280	83	63	29	19	9,511	8,271	6,534	5,610	**49,507**
19 yrs	5,309	6,399	405	240	4,556	3,485	4,762	4,043	10,818	10,809	**50,826**
20 yrs	3,768	5,045	10,393	8,768	6,489	5,842	2,215	2,378	2,596	3,474	**50,968**
17yrs - 20 yrs	33,492	37,209	10,893	9,079	11,075	9,346	25,706	22,492	19,974	19,907	199,173
21yrs - 24yrs	8,819	12,931	85,061	77,750	8,941	6,411	3,032	4,116	2,270	4,064	**213,395**
25yrs - 29yrs	5,405	9,275	133,182	126,419	5,372	1,629	413	617	1,553	2,105	**285,970**
30yrs - 39yrs	4,637	9,171	286,265	279,491	5,817	1,530	0	0	1,428	1,850	**590,189**
40yrs - 49yrs	1,798	4,016	297,581	289,853	3,304	1,227	0	0	482	640	**598,901**
50yrs - 59yrs	794	1,649	265,777	254,917	1,678	521	0	0	187	168	**525,691**
60yrs - 69yrs	274	440	204,314	181,415	633	112	0	0	72	36	**387,296**
										Total licenced drivers age 25 - 69	**2,388,047**
70yrs - 74yrs	57	56	61,399	50,904	81	13	0	0	8	2	**112,520**
75yrs and above	29	18	81,423	58,493	36	8	0	0	5	3	**140,015**
Total	**107,761**	**129,825**	**1,436,788**	**1,337,400**	**48,012**	**30,143**	**54,858**	**49,717**	**45,953**	**48,682**	**5,677,186**

8 Appendix B: Web Crash Data

Source: Queensland Department of Transport and Main Roads

Appendix B is included on the electronic version as another file titled ‘Appendix B- web crash data’