

THE VICTORIAN GRADUATED LICENSING SYSTEM

OUTCOME EVALUATION 2017

David Healy - D J Healy Road Safety Consulting

Kelly Imberger - Senior Policy Officer, VicRoads

John Catchpole - Principal Behavioural Scientist, Australian Road Research Board (ARRB)

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the following road safety professionals for their contribution to the research contained within this report and/or with their project assistance.

Name	Organisation	Position
Ms Antonietta Cavallo	<i>Previously</i> VicRoads	<i>Previously</i> Director Road Safety Strategy
	<i>Currently</i> Centre for Road Safety, Transport for NSW	<i>Currently</i> Director Strategy & Policy
	Cavallo Consulting Strategic Road Safety Services	Director
Dr Sophie Oh	VicRoads	Senior Policy Officer
Ms Victoria Pyta	<i>Previously</i> Australian Road Research Board	<i>Previously</i> Senior Research Officer
	<i>Currently</i> VicRoads	<i>Currently</i> Senior Policy Officer
Dr Eve Mitsopoulos-Rubens	VicRoads	Senior Policy Officer
Mr Warren Harrison (now deceased)	Eastern Professional Services Pty Ltd	Social and behavioural scientist
Mr Daniel Mayhew	Traffic Injury Research Foundation Ottawa, Canada	Senior Vice President
Dr Dorothy Begg	University of Otago New Zealand	Senior Research Fellow (Injury epidemiology)
Dr Jean Shope	University of Michigan Transportation Research Institute	Research Professor
Mr Fridulv Sagberg	Institute of Transport Economics Norwegian Centre for Transport Research	Senior Research Psychologist
Dr Allison McIntyre	Allison McIntyre Consulting	Director
Ms Tariro Makwasha	Australian Road Research Board	Research Officer
Dr Stuart Newstead	Monash University Accident Research Centre	Associate Professor Associate Director
Dr Denny Meyer	Swinburne University of Technology	Associate Professor Statistics

Name	Organisation	Position
Dr Christine Cunningham	Swinburne University of Technology	Consultant Researcher
Ms Natalia Rajendran	Swinburne University of Technology	Consultant Researcher
Ms Kerryn Alexander	Kerryn Alexander Research	Director
Dr Max Cameron	Camcomp Partners Pty Ltd	Statistician Director

This report draws on various reports, information and advice prepared by the road safety professionals above in addition to enforcement data provided by Victoria Police and the Department of Justice and Regulation. This evaluation was managed by the Driver Performance Team in the Access and Operations Division of VicRoads.

ABSTRACT

Against a background of strong community support, the Victorian Government introduced an enhanced GLS in three phases during 2007 and 2008. The key objective of the enhanced GLS is to introduce young drivers into driving gradually through a safer, evidence-based graduated system. The enhanced GLS gradually exposes the novice driver to increasing driving task demands by applying various driving restrictions and requirements as a learner and then in their first three years of driving.

The approach to the evaluation reflected the need to understand both the overall trends in offence and crash numbers and rates involving novice drivers as well as, via learner and probationary driver surveys, the behavioural responses to each of the influential components introduced as part of the enhanced GLS. This evaluation also considered possible variations over time in enforcement and learner permit and licensing trends where possible. A series of key evaluation questions were posed, and the data collected and analysis methods used were designed to address these questions. The most pertinent questions were 'Was the enhanced GLS successful in reducing the absolute number of young driver crash involvements?' and 'Did the enhanced GLS have an overall reduction effect on the crash rates of young drivers?'

The evaluation showed the enhanced GLS with a preceding set of education programs and publicity since 1994 has contributed to improving the safety of young, newly-licensed drivers, especially those aged 18 to 20 years at licence and in their first year of driving. Some key evaluation results include:

- The absolute number of young drivers aged 18 to 23 years involved in casualty crashes and fatal and serious injury (FSI) crash involvements decreased over the 13 year study period (from 2001/02 to 2003/04 [pre-GLS] to 2011/12 to 2013/14 [post-GLS]) and this was substantially greater (42.5% decrease) than the comparison group aged 35 to 42 years (29% decrease). The reduction was most marked for drivers aged 18 to 20 years (48% decrease), drivers subject to all the enhanced GLS provisions (P1/P2 licence stages), with estimated savings of 534 casualty crash involvements and 128 serious injury crash involvements per annum.
- For drivers aged 18 to 20 years, the group with the highest rates of involvement pre-GLS, their casualty crash involvement rate reduced overall by a significant 13.6% and their FSI involvement rate by a significant 20.3% relative to a comparison group of fully licensed drivers.
- There were no significant changes in the crash involvement rates for drivers aged 21 to 23 years. However, for this age group the female casualty crash involvement rate increased by a significant 14.3%, the increase most evident in country areas (30%) for these females. However, the serious injury crash involvement rate for males in this age group decreased by a significant 23.4% with the reduction especially evident in metropolitan areas (24.4%).
- Casualty and FSI crash involvement rates of drivers aged 18 to 23 years at licence in their first year of driving dropped significantly by 18.7% and 19.4% respectively.
- In their first year of driving, drivers aged 18 to 20 years at licence were involved in 19.2% fewer casualty crash rate involvements and 21.7% fewer FSI crash rate involvements relative to a comparison group of fully licensed drivers. There were no reductions for drivers aged 21 to 23 years.
- There were no equivalent reductions for drivers aged 18 to 20 years at licence in their second or third year of driving.
- Casualty crash involvement rates for drivers aged 18 to 23 years at licence in their fourth year of driving increased by 18.2% overall with significant increases noted for drivers licensed at 18 to 20 years, female drivers and crash involvement rates in the metropolitan area.

TABLE OF CONTENTS

SUMMARY	I
BACKGROUND	I
THE GRADUATED LICENSING SYSTEM (GLS)	I
RESULTS AND DISCUSSION.....	III
<i>Learner driver behaviour</i>	<i>iii</i>
<i>Probationary driver behaviour</i>	<i>iv</i>
<i>Trends in rates of offending</i>	<i>vi</i>
<i>Learner permit and licensing trends</i>	<i>viii</i>
<i>Crash involvement trends</i>	<i>x</i>
DISCUSSION.....	XIX
CONCLUSION.....	XXI
BACKGROUND	1
OVERVIEW OF THE GRADUATED LICENSING SYSTEM PROGRAM	1
IMPETUS FOR THE GLS.....	3
EVIDENCE FOR A GLS AS AN EFFECTIVE INTERVENTION.....	4
THE GLS PROGRAM	6
INTRODUCTION	6
REQUIREMENTS FOR LEARNER PERMIT HOLDERS.....	6
REQUIREMENTS TO OBTAIN A PROBATIONARY LICENCE	6
REQUIREMENTS FOR PROBATIONARY LICENCE HOLDERS.....	7
PENALTIES FOR DRINK-DRIVING OFFENCES	8
SUPPORT PROGRAMS	9
APPROACH TO AND OBJECTIVE OF THE GLS EVALUATION	11
LEARNER DRIVER BEHAVIOUR	19
INTRODUCTION AND METHOD.....	19
TOTAL HOURS OF DRIVING EXPERIENCE (SUPERVISED PRACTICE PLUS LESSONS).....	20
<i>All learners</i>	<i>20</i>
<i>Gender and location comparisons</i>	<i>21</i>
<i>Average increases in hours across the surveys by age at learner permit acquisition</i>	<i>22</i>
DURATION OF THE LEARNER PERIOD.....	23
SUMMARY	24
DISCUSSION.....	25
PROBATIONARY DRIVER BEHAVIOUR	28
INTRODUCTION AND METHOD.....	28
RESULTS.....	31
<i>Compliance with the P1 Licence</i>	<i>31</i>
<i>Risky driving behaviours</i>	<i>34</i>
<i>Probationary requirements</i>	<i>37</i>

SUMMARY	38
DISCUSSION.....	39
TRENDS IN RATES OF OFFENDING	41
INTRODUCTION	41
POTENTIAL IMPACT OF THE GLS ON OFFENDING.....	41
METHOD OF ANALYSIS	43
<i>Data source</i>	43
<i>Pre and post-GLS periods</i>	43
<i>Study design</i>	44
<i>Selection of offences</i>	46
<i>Statistical testing</i>	47
RESULTS.....	47
<i>Offences newly-created for the GLS</i>	48
<i>Overall comparison of driver groups</i>	48
<i>Summary</i>	50
DISCUSSION.....	52
LEARNER PERMIT AND LICENSING TRENDS.....	55
INTRODUCTION AND METHOD.....	55
LICENSING TRENDS OVER TIME	55
TRENDS IN LEARNER PERMIT TENURE	57
TRENDS IN DRIVER LICENSING	60
<i>Licensing trends by gender</i>	60
<i>Licensing trends by age at licence</i>	60
<i>Licensing trends by region</i>	64
<i>Licensing trends by time permit held</i>	67
LICENSING TRENDS AND THE DRIVE TEST	69
LICENSING AGE PROFILE FOR A COHORT OF 18 YEAR OLDS, PRE AND POST-GLS	72
SUMMARY	73
DISCUSSION.....	74
CRASH INVOLVEMENT TRENDS	77
INTRODUCTION AND AIMS	77
METHOD	77
<i>Licensing data</i>	77
<i>Crash data</i>	78
<i>Calculation of exposure and crash involvement rates</i>	78
<i>Statistical analysis</i>	78
AGE AT CRASH INVOLVEMENT.....	79
<i>Crash reductions</i>	79
<i>Crash trends over time</i>	82
<i>Key findings summary</i>	86

The Victorian Graduated Licensing System: Outcome Evaluation 2017

<i>Discussion</i>	87
AGE AT CRASH INVOLVEMENT: BEFORE AND AFTER COMPARISON	88
<i>Aims</i>	88
<i>Analysis approach</i>	88
<i>Results</i>	89
<i>Key findings summary</i>	93
<i>Discussion</i>	94
TIME SINCE FIRST LICENCE ISSUE (EXPERIENCE): BEFORE AND AFTER COMPARISON.....	95
<i>Aims</i>	95
<i>Analysis approach</i>	95
<i>Results</i>	96
<i>Key findings summary</i>	99
<i>Discussion</i>	101
ALCOHOL INVOLVEMENT: BEFORE AND AFTER COMPARISON	102
<i>Aims</i>	102
<i>Analysis approach</i>	102
<i>Results</i>	103
<i>Key findings summary</i>	105
<i>Discussion</i>	106
PEER PASSENGERS: BEFORE AND AFTER COMPARISON.....	107
<i>Aims</i>	107
<i>Analysis approach</i>	107
<i>Results</i>	108
<i>Key findings summary</i>	110
<i>Discussion</i>	111
LEARNER PERMIT HOLDERS: TIME SERIES.....	111
<i>Aims</i>	111
<i>Analysis approach</i>	112
<i>Results</i>	112
<i>Key findings summary</i>	114
<i>Discussion</i>	114
DISCUSSION	115
CONCLUSION	120
REFERENCES	122
APPENDIX A – YOUNG DRIVER SUPPORT PROGRAMS	124
APPENDIX B – DESCRIPTIONS OF SELECTED OFFENCES	126
APPENDIX C – DRIVER EXCLUSIONS (CRASH ANALYSIS)	140
APPENDIX D – EXPOSURE (DRIVER DAYS BY FINANCIAL YEAR AND AGE) (CRASH ANALYSIS)	141
APPENDIX E – AGE AT CRASH INVOLVEMENT TIME SERIES	142

APPENDIX F – AGE AT CRASH INVOLVEMENT BY GENDER/ REGION 146
APPENDIX G – TIME SINCE FIRST LICENCE ISSUE (EXPERIENCE) ADDITIONAL RESULTS . 150

Tables

Table 1:	GLS evaluation topic areas – evaluation questions, components and methods.....	13
Table 2:	GLS evaluation components – order of evaluation components and years of data analysed in each component.....	18
Table 3:	Estimated mean number of weeks spent holding a learner permit by age at acquisition by survey year	23
Table 4:	Dates of licensing and data collection for the pre- and post-GLS cohorts	29
Table 5:	The design of the cross-section study, outlining participant groups surveyed at each wave of data collection	29
Table 6:	Participation and retention rates in the cohort study	30
Table 7:	Participation rates in each wave of the cross-section survey.....	30
Table 8:	The percentage of pre and post-GLS participants who had used a mobile phone hands-free in their last ten trips by location.....	33
Table 9:	The percentage of fourth year drivers who had driven after drinking in the last ten trips, according to location and GLS subgroup	35
Table 10:	Speed offence counts (detections) by style of enforcement – pre-GLS and post-GLS Source: Department of Justice and Regulation.....	42
Table 11:	Roadside alcohol screening test counts – pre-GLS and post-GLS Source: Victoria Police	43
Table 12:	Driver groups for offence analysis	45
Table 13:	Rates of peer passenger and hands-free mobile phone offences (restricted to first-year licence holders in the post-GLS Novice Group 1)	48
Table 14:	Offence rates for Novice Group 1 (18–20 years at licence) and Comparison Group 1	49
Table 15:	Offence rates for Novice Group 2 (21–24 years at licence) and Comparison Group 2	49
Table 16:	Summary of offence rate changes for novice groups net of changes for comparison groups (Novice Group 1 - 18 to 20 years at licence issue, Novice Group 2 - 21 to 24 years at licence issue).....	51
Table 17:	Count of crash involvements by drivers aged 18–20, 21–23, 18–23 and 35–42 years - 2001/02 to 2003/04 (pre-GLS) compared with 2011/12 to 2013/14 (post-GLS), including percent reduction	80
Table 18:	Average annual driver-days ('000s) by driver group by time interval	81

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Table 19:	Estimated savings per annum in crash involvements by crash severity and driver age relative to reductions in comparison group.....	82
Table 20:	Analysis approach	88
Table 21:	Casualty crash involvement rate per 10,000 driver-years by age at crash	89
Table 22:	FSI crash involvement rate per 10,000 driver-years by age at crash.....	90
Table 23:	Modelling results for casualty crash involvement rates of drivers aged 18 to 20 years at crash involvement.....	91
Table 24:	Modelling results for casualty crash involvement rates of drivers aged 21 to 23 years at crash involvement.....	91
Table 25:	Modelling results for FSI crash involvement rates of drivers aged 18 to 20 years at crash involvement.....	92
Table 26:	Modelling results for FSI crash involvement rates of drivers aged 21 to 23 years at crash involvement.....	93
Table 27:	Casualty crash involvement rate per 10,000 driver-years by licence issue age by years since licence issue	96
Table 28:	FSI crash involvement rate per 10,000 driver-years by licence issue age by years since licence issue	97
Table 29:	Statistically significant results for modelling of crash involvement rates of young drivers (18–23 years) in their first year of driving	98
Table 30:	Statistically significant results for modelling of casualty crash involvement rates of young drivers (licensed at 18–23 years) in their fourth year of driving.....	99
Table 31:	High alcohol hour casualty crash involvement rate per 10,000 driver-years by licence issue age by gender: fourth-year drivers aged 18 to 20 years at licence and comparison group.....	104
Table 32:	High alcohol hour fatal and serious injury crash involvement rate per 10,000 driver-years by licence issue age by gender: fourth-year drivers at 18 to 20 years at licence and comparison group.....	104
Table 33:	Casualty crash involvement rate by number of peer passengers	108
Table 34:	Fatal and serious injury crash involvement rate by number of peer passengers.....	108
Table 35:	Statistically significant results comparing modelled casualty crash involvement rates of P1 drivers with comparison group	109
Table 36:	Statistically significant results comparing modelled FSI crash involvement rates of P1 drivers with comparison group	110
Table 37:	Exceed BAC limit offences	126
Table 38:	Court offences	127

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Table 39:	TIN offences	131
Table 40:	Speed offences.....	133
Table 41:	Alcohol-related offences	135
Table 42:	Other offences	137
Table 43:	Exposure by financial year and age	141
Table 44:	Casualty crash involvements by financial year by age at crash and crash involvement rate (2 tables, rates based on exposure figures in previous appendix)	142
Table 45:	Fatal and serious injury crash involvements by financial year by age at crash and crash involvement rate (2 tables, rates based on exposure figures in previous appendix)	143
Table 46:	Casualty crash involvement rate per 10,000 driver-years by age at crash by gender.....	146
Table 47:	FSI crash involvement rate per 10,000 driver-years by age at crash by gender	147
Table 48:	Casualty crash involvement rate per 10,000 driver-years by crash location.....	148
Table 49:	FSI crash involvement rate per 10,000 driver-years by crash location	149
Table 50:	Casualty crash involvement rate per 10,000 driver-years by gender by licence issue age by years since licence issue.....	150
Table 51:	Fatal and serious injury crash involvement rate per 10,000 driver-years by gender by licence issue age by years since licence issue	153
Table 52:	Casualty crash involvement rate per 10,000 driver-years by crash location by licence issue age by years since licence issue	155
Table 53:	Fatal and serious injury crash involvement rate per 10,000 driver-years by crash location by licence issue age by years since licence issue	158

Figures

Figure 1:	Age of Victorian drivers involved in casualty crashes 1999 to 2004	4
Figure 2:	Probationary driver risk of crashing	4
Figure 3:	Estimated total practice hours (all learners) with 95% confidence intervals (CI)	20
Figure 4:	Estimated total practice hours by gender and region	21
Figure 5:	Estimated total practice hours by age when the learner permit was issued	23
Figure 6:	Average duration of the learner permit in weeks by age at learner permit acquisition and year of survey Note: Linear refers to trend line	24
Figure 7:	The percentage of trips in the last two days, during which first year drivers aged under 21 at licensing had carried one or more than one passenger aged 16 to 21	32
Figure 8:	The percentage of first year drivers aged under 21 at licensing who had used, in the last ten trips, a hands-free mobile phone while driving	33
Figure 9:	The percentage of 4 th year drivers from the cross-section study who had in the last ten trips 'driven after drinking when they probably shouldn't have'	34
Figure 10:	Mean trips in the last ten in which participants had 'driven after drinking when they probably shouldn't have'	36
Figure 11:	Mean trips in the last ten where hand held mobile phones were used for conversation and text messages	37
Figure 12:	Young adult licensing rates per head of population by single year of age at licence 18 to 24 years (1991/92 to 2013/14)	56
Figure 13:	Young adult licensing rates per head of population by single year of age 19 to 24 years (1991/92 to 2013/14) (excludes 18 year olds)	57
Figure 14:	Count of first learner permits issued to drivers aged 16 to 24 years by six monthly periods of permit issue and time the permit held until licence issue Note: Period A comprises January-June and period B comprises July-December	58
Figure 15:	Percentage of new first learner permit holders aged 16 to 24 years who held the permit for at least two years before obtaining a licence by period of issue Note: Period A comprises January-June and period B comprises July-December	59
Figure 16:	Count of first licences issued to drivers aged 18 to 24 years by gender and financial year	60
Figure 17:	Count of first licences issued by age and financial year	61

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Figure 18:	Count of first licences issued by age and financial year (excludes 18 year olds)	62
Figure 19:	Count of first licences issued to drivers aged 18–20 years by financial year by gender.....	62
Figure 20:	Count of first licences issued to drivers aged 21–24 years by financial year by gender.....	63
Figure 21:	First licences issued by single year of age as a percentage of licences issued within the age band 18 to 24 years by financial year	64
Figure 22:	Count of first licences issued to drivers aged 18 to 24 years by region and financial year.....	65
Figure 23:	First licences issued to drivers aged 18 to 24 years: ratio of Greater Melbourne to Regional Victoria by financial year	66
Figure 24:	First licences issued to drivers aged 18 to 24 years: ratio of Greater Melbourne to Regional Victoria by single month	66
Figure 25:	Count of first licences issued to drivers aged 18 to 20 years by period of licence issue and elapsed time from first learner permit issue to first licence issue Note: In each calendar year, period A comprises January to June and period B comprises July to December	67
Figure 26:	Count of first licences issued to drivers aged 21 to 24 years by period of licence issue and elapsed time from first learner permit issue to first licence issue Note: In each calendar year, period A comprises January to June and period B comprises July to December	68
Figure 27:	Percentage of new first licence holders aged 18 to 24 who had held the learner permit for at least two years by period* of licence issue	69
Figure 28:	Number of Drive Test attempts by single year of age (18 to 24 years) [counts multiple attempts by the same person].....	70
Figure 29:	Practical Drive Test pass rate by single year of age	71
Figure 30:	Count of practical Drive Test passes by single year of driver age	72
Figure 31:	Numbers licensed by age at licence for 18 year old cohorts, pre and post-GLS Note: Pre-cohort: 18 years of age in 2003; post-cohort: 18 years of age in 2010	73
Figure 32:	Casualty crash involvement rate per 10,000 driver-years by driver age.....	83
Figure 33:	Ratio of novice to comparison group casualty crash involvement rates per 10,000 driver-years by age of novice driver	84
Figure 34:	Fatal and serious injury crash involvement rate per 10,000 driver-years by driver age.....	85

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Figure 35: Ratio of novice to comparison group fatal and serious injury crash involvement rates per 10,000 driver-years by age of novice driver 86

Figure 36: Casualty crash involvement rate per 10,000 driver-years by supervision at the time of the crash for learners who have held the permit less than six years 113

Figure 37: FSI crash involvement rate per 10,000 driver-years by supervision at the time of the crash for learners who have held the permit less than six years 113

SUMMARY

Background

Victoria has one of the safest road transport systems nationally and worldwide. However, in the early 2000s despite recent reductions in the Victorian road toll, young drivers aged 18 to 25 years continued to be greatly over-represented in road crashes in comparison with older, more experienced drivers. VicRoads reviewed international evidence relating to the young driver problem and found that a more comprehensive graduated licensing system (GLS) could be expected to offer worthwhile reductions in novice driver crash involvement. As a result, VicRoads introduced an enhanced GLS during 2007 and 2008.

The Graduated Licensing System (GLS)

Against a background of strong community support, the enhanced GLS was introduced progressively in three phases commencing in 1 January 2007 with the final phase introduced on 1 July 2008. The key objective of the enhanced GLS is to introduce young drivers into driving gradually through a safer, evidence-based graduated system. The enhanced GLS represented the culmination of consultation with experts in the fields of young driver safety and evaluation, a comprehensive review of the literature and a detailed analysis of crash trends involving beginning drivers in Victoria.

The first phase of the enhanced GLS introduced on 1 January 2007 included:

- alcohol interlock requirements for probationary drink-drivers under the age of 26 years as a condition of licence restoration
- compulsory carriage of licence for all drivers under the age of 26 years.

The second phase, introduced on 1 July 2007, included:

- a minimum 12 months learner permit period and a minimum 120 hours on-road supervised driving experience (including at least 10 hours at night) as a learner (for those aged under 21 years at the time of licensing)
- a requirement to carry the learner permit when learning to drive
- a ban on any mobile phone use when learning to drive
- new high-powered vehicle restrictions for P-plates.

The final series of measures of the enhanced GLS, introduced on 1 July 2008, comprised:

- an increased probationary period from three to four years (P1 for one year and P2 for three years) for those licensed from 18 to 20 years, while those licensed at 21 years or over move straight to P2
- a ban on any mobile phone use by P1 drivers
- a ban on towing by P1 drivers (unless for work or if under instruction)
- a requirement for a good driving record (no offences committed resulting in driving bans being served) to graduate from P1 to P2 and to graduate from P2 to a full licence
- a restriction on P1 drivers from carrying more than one peer passenger (aged between 16 and 21 years) other than family members, except when accompanied by a fully licensed driver (as is the case for learner drivers)
- extension of the zero blood alcohol requirement from three to four years aligned with the P1 and P2 licences
- a new Drive Test to help identify those licence applicants who have met the minimum 120 hour requirement and can demonstrate key safe driving capabilities for solo driving.

The above measures were introduced following implementation of a series of young driver support measures that had been introduced by the Victorian road safety agencies from 1994. These support programs were introduced to encourage learner driver practice and decrease risk taking among novice drivers. They included targeted materials to assist novice drivers, parents and driving instructors and mass media public education accompanied by direct mail encouraging the attainment of at least 120 hours of supervised learner driver practice.

Approach to the evaluation

The key objective of this evaluation was to examine the effect of the enhanced GLS on young novice driver safety. To achieve this, the evaluation was guided by a series of questions sitting under the following eight topic areas:

- crashes
- offences
- learner permit and licensing trends
- learner driver supervised practice
- carriage of peer passengers
- drink-driving behaviour
- speeding behaviour
- other behaviours and requirements (e.g. mobile phone use).

Five sources of data, collected before and after the introduction of the GLS were used to help answer key evaluation questions. These data sources included:

1. **crash involvement counts and rates:** rates and involvement in fatal and serious injury (FSI) and casualty crashes¹, using comparison groups
2. **offence rates:** offence rates, using comparison groups
3. **learner driver self-reported experience:** a series of surveys (using independent samples of drivers) about learner driver experience
4. **probationary self-reported driver behaviour:** a series of surveys (using independent samples of drivers) and longitudinal surveys (following a cohort of drivers) about probationary driver behaviour
5. **learner permit and licensing trends:** patterns in the issue and tenure of learner permits and licences.

Results and discussion

Learner driver behaviour

Method

Since 1999, the Learner Monitor telephone survey has measured the supervised driving and driving lesson experiences with professional driving instructors of a representative sample of Victorian learner permit holders. Surveys have taken place in 1999, 2000, 2004, 2005, 2007, 2008, 2009, 2010 and 2014.

Each of these cross-sectional surveys included approximately 1300 learner drivers and 200 drivers who had recently obtained their probationary licence, the latter to obtain information in the three to four weeks leading up to licence application.

In addition to the yearly survey results, in 2014 an analysis was undertaken to determine if changes in practice hours across surveys conducted since 1999 had been statistically significant. Statistical methods were used to determine if learner driver preparation over the last 15 years (nine surveys) had seen progress in achieving the minimum target of 120 hours of practice over the entire learner permit period.

¹ Casualty crashes are fatal, serious (admitted to hospital) and minor injury crashes.

Results

The Learner Monitor surveys found:

- Across all learner permit holders, average practice hours generally increased in an approximately linear fashion from 1999 (83 hours) to 2014 (just under 120 hours), with a slight dip accompanying the introduction of the enhanced GLS in 2008. Compared with 1999, a statistically significant improvement occurred over each survey from 2005 to 2014. However, in comparison with 2005, there were no statistically significant improvements over the following survey years although significance was nearly achieved for 2014. However, a continuing upward trend, with the exception of a small dip in 2008, is evident.
- Females performed better than males with practice hour averages in excess of 120 hours in 2014 compared with slightly over 100 hours for males. Changes in practice hours over time were statistically significant for females.
- Seventeen year olds at learner permit acquisition increased their hours significantly from 46 hours in 1999 to 127 hours in 2014.
- Sixteen year olds at learner permit acquisition started at 108 hours in 1999, attained the 120 hour target in 2000 and achieved more than the minimum target of 120 hours driving practice in 2014 (137 hours) (significant changes).
- Those aged eighteen years and above (at learner permit acquisition) did not show significant improvement in practice hours across the surveys and did not achieve 120 hours of practice (88 hours in 2014).

Discussion

These findings point to the effectiveness of the educational and promotional measures leading up to the enhanced GLS as well as the GLS itself in helping to promote the attainment of at least 120 hours of supervised driving practice, especially among those aged 16 and 17 years at learner permit acquisition. Importantly, this is the group who constitutes the majority of those taking out a permit in the age range 18 to 24 years (69%), and the group most likely to take out a licence in the age range 18 to 20 years and so, post-GLS, be subject to the full provisions of the P1 and P2 stages of the GLS.

Probationary driver behaviour

Method

A series of surveys were undertaken to assess the effects of the GLS requirements on self-reported probationary driver behaviour, before and after the enhanced GLS. A combination of cross-section surveys (independent samples of drivers, a series of four in total) and

longitudinal surveys following a cohort of young drivers licensed under the former GLS and a cohort of young drivers licensed under the enhanced GLS (post cohort) were undertaken. Comparisons pre- and post-GLS were statistically tested. Results are statistically significant unless indicated.

Results

The main findings of the probationary driver surveys were:

- The proportion of trips for first year drivers with more than one peer passenger decreased significantly from around 13% pre-GLS to less than 5% of trips post-GLS with no significant change evident for trips undertaken with one peer passenger.
- First year drivers, who under the enhanced GLS were not permitted to use a hands-free phone, significantly reduced their reported frequency of use in their last ten trips from 29% pre-GLS to 19% post-GLS.
- Fourth year drivers halved their self-reported drink-driving post-GLS (5%) compared with drivers in their first year of fully-licensed driving after the three year probationary period pre-GLS (10%).
- Third year drivers also reported significantly reduced levels of drink-driving post-GLS (5.3%) compared with pre-GLS (7.5%).
- There were significantly more trips recorded with text messaging on a hand-held mobile phone post-GLS (from 0.74 trips pre-GLS to 1.03 trips in the last 10 post-GLS).
- There were no statistically significant differences pre to post-GLS for the cross-section nor cohort studies for risky driving behaviours (speeding, driving fatigued or without a seatbelt). Speeding by less than 10 km/h was on average reported in around two trips in the last ten and driving while very tired was reported in about one trip in the last ten.

Discussion

In line with the new provisions of the enhanced GLS, the probationary driver surveys point encouragingly to significant reductions in the carriage of multiple peer passengers among first year drivers post-GLS, as well as reduced levels of drink-driving among fourth year drivers post-GLS who were subject to the extended zero blood alcohol requirement. Reduced levels of drink-driving were also reported by drivers in their third year post-GLS (significant only for the cross-section surveys).

Similarly, use of a hands-free mobile phone was significantly less common among P1 post-GLS drivers than their pre-GLS counterparts. Nonetheless, usage rates remained at high levels. While there was no increase in conversation, the increase in text messaging using a

hand-held phone post-GLS warrants further investigation. It is conceivable that the increase simply reflects a growth in this type of communication over time among young people especially, with the hand-held phone lending itself more readily to covert texting. More investigation is needed across all forms of illegal phone use.

Overall, the results of the probationary driver surveys generally point to positive outcomes in behaviour change linked to the key provisions of the enhanced GLS addressing peer passenger carriage, hands-free mobile phone use among first year drivers and drink-driving among fourth year drivers.

Trends in rates of offending

Method

With a view to better understanding the impact of the enhanced GLS on driver behaviour, an analysis of offence rates before and after the introduction of the GLS was conducted with licensing and offence data sourced from the VicRoads Driver Licensing System (DLS).

Offence rates 'per 100 driver-years' for drivers first licensed in the age ranges of 18 to 20 years and 21 to 24 years were compared between a four year period before and a four year period after the enhanced GLS was introduced. Comparison groups were chosen who were more experienced as drivers, but were also licensed within the same age ranges in order to allow for ambient external factors that may influence the offence experience of each group in a similar way. A number of separate statistical tests were undertaken to assess changes in offence rates for each driver group by age or experience at the time of offence for a number of broad offence categories. Statistical testing involved the calculation of odds ratios that compared changes for the novice groups with changes for the corresponding comparison groups. The odds ratios were converted to Z-scores to assess their statistical significance.

Results

The main findings were:

- Overall, the offence rates of probationary drivers changed relatively little from pre to post-GLS.
- For drivers aged 18 to 20 years at licence in their first three years of driving and for the subset of drivers aged 18 to 20 years at time of offence, the following broad trends were discerned:
 - while Traffic Infringement Notice (TIN) offence rates remained relatively stable, offence rates for exceed BAC limits, court offences, alcohol and 'other' offences all decreased (most reductions were significant)
 - speed offences increased, and significantly so for those in their first three years

of driving and those aged 19 (9.8%) and 20 (9.1%) at offence, but least for drivers with zero to less than a year of experience (4.3%).

- For drivers aged 18 to 20 years at licence in their fourth year of driving (full licence holders pre-GLS while fourth year probationary drivers post-GLS):
 - offence rates dropped significantly overall by 9.3%, for traffic infringements (TINs) (11.1%) and for speed offences (21.3%); alcohol offences also dropped but not significantly
 - ‘other’² offence rates increased significantly (19.5%) while court offences also increased, but not significantly.
- For drivers aged 21 to 24 years at licence, the following trends in offence rates were apparent:
 - overall offence rates reduced for exceeding BAC limits, court offences, alcohol and other offence types, the majority of which were not significant (relatively small sample sizes reduced the likelihood of significance)
 - offence rates for TINs and speed offences generally increased and significantly so for drivers in their first year of driving solo (10.7% and 15.7% respectively)
 - drivers in their first year registered an overall 8% significant increase in offences
 - similar trends (to drivers aged 21 to 24 years at licence) were observed for drivers aged 21 years at offence whose offence rates also increased for TINs and speed offences but significantly so only for speed offences (26.6%).

Discussion

Overall, the relative offence rates of drivers aged 18 to 20 years at licence changed little in the post-GLS compared with the pre-GLS period after accounting for the trend in the comparison group. The main exception was drivers in their fourth year, the last year of the extended probationary period under the enhanced GLS, for whom the relative offence rate decreased by a significant 9.3%. Analyses by offence category, however, provided mixed results.

Favourable trends were generally observed, with exceptions, across both novice groups (18 to 20 and 21 to 24 years) for court offence rates and those linked to alcohol use and ‘other’ offences. These trends may potentially reflect the new provision under the GLS whereby any period of licence loss during the probationary period will result in an extension to the probationary period by six months. However, an investigation analysing the effect of this GLS component was not undertaken.

² Other offences include offences such as disobey traffic control signal, drive without P-plates and use hand-held mobile phone while driving.

Speed offence rates, however, generally increased with the exception of drivers in their last year of the P1/P2 probationary licence. TINs also increased (overlapping with speed offences) for drivers licensed at ages 21 to 24 years. It is difficult to explain these results as an outcome arising directly from the provisions of the enhanced GLS. One possible explanation is that experienced drivers are more attuned and responsive in the short term to changes in the level of speed enforcement activity than are young, inexperienced drivers.

A real world evaluation is potentially subject to a number of influences with one such example described above. As a result, it is not possible to ascribe a direct 'cause - effect' relationship between introduction of the enhanced GLS and the observed changes in offence rates. While the analysis of traffic offence rates did provide mixed results, it is highly likely nevertheless that the enhanced GLS has had some influence in reducing the overall rate of serious offending for court related and drink-driving offences.

Learner permit and licensing trends

Method

In order to understand the true impact of the enhanced GLS and interpret the outcomes of the crash analyses, it is important to understand the broad trends over time in the numbers of learner permits and licences issued and the direct influence, if any, of the enhanced GLS itself. The learner permit and licence trends analysis, which was undertaken subsequent to the offence analysis, yielded results that helped in the design of the crash evaluation.

Records of drivers aged under 25 years who were issued their first Victorian car learner permit or first Victorian car licence from July 1991 to June 2014 were obtained from the VicRoads DLS. Trends over time in the number of first car learner permits and first car licences issued, broken down by gender, age and region, were analysed. No statistical testing was undertaken on this analysis, as absolute learner permit and licensing counts and trends were of interest.

Results

The key findings included:

- In the lead up to the introduction of the enhanced GLS, licensing rates per head of population were relatively steady for each year of licensing age, 18 to 24 years.
- First licences issued peaked in 2007/08 in advance of the GLS and then dipped in 2008/09 with the dip most pronounced for 18 year olds, followed by 19 and then 20 year olds.
- The number of licences issued rebounded following the dip, most strongly for those aged 21 to 24 years at licence; while for 18 year olds, the recovery was only slight with levels

remaining below those pre-2008.

- Licensing profiles for males and females were similar over time.
- Licensing profiles for those licensed in the Greater Melbourne and Regional Victoria were similar over time, but with a dip pre-GLS (2008/09) and a rebound after the introduction of the GLS (2009/10 to 2012/13) being more pronounced for the Metropolitan Area.
- A new profile across licensing ages, 18 to 24 years, emerged with 18 year olds dropping from 74% to 62% of new licences issued while 21 to 24 year olds comprised 19% of new licensees in 2013/14 compared with 10% before the GLS.
- Learner permit tenure has increased considerably since GLS introduction. Sixty percent of 18 to 20 year olds have held a learner permit for at least 24 months compared with 37% pre-GLS. For those aged 21 to 24 at licence, the equivalent figures were 66% post-GLS versus 41% pre-GLS for learner permits held for at least 36 months.
- Practical Drive Test pass rates reached their lowest level with the introduction of the new test, and then increased year on year (2009 to 2013) post-GLS.

Discussion

The enhanced GLS introduction has resulted in a number of changes that directly influenced the licence issue age profile of young Victorian drivers. Short-term changes were evident in the lead up to and immediately after the introduction of the enhanced GLS as some young people chose to take out their learner permits before 1 July 2007 and their probationary licence in advance of changes to the probationary licence requirements on 1 July 2008. Since the GLS introduction, the profile of 'age at licence' has evolved over time with fewer 18 year olds taking out licences, a modest increase among 19 year olds and an increase in the proportion of those aged 21 to 24 years growing from around 10% pre-GLS to approximately 19% of all new licence-holders aged 18 to 24 years in 2013/14. The trend towards later licensing is reflected in the significant increase among young people of length of learner permit tenure with the GLS introduction.

It is likely that the combination of factors relating to the requirements of the GLS were responsible for the changing age licensing profile. Primary contributing factors include:

- young people postponing applying for a licence until ages 19 or 20 years as a result of the 12 month minimum learner permit and minimum 120 hours of supervised practice requirements, with a corresponding drop in 18 year olds taking out licences
- the new Drive Test, designed to assess driver proficiency in higher-order driving skills, causing some young people to be unsuccessful initially in gaining a probationary licence

- the new, two-tiered structure of the GLS potentially encouraging some new drivers to postpone their licence until age 21 years or older to be subject only to the three-year P2 stage of the new licensing arrangements.

These results have implications for the analysis of crash involvements. Disruptions to licensing trends immediately before and after the enhanced GLS coupled with a progressive shift over several financial years to a new age profile of licensees post-GLS means that adequate gaps in time had to be left before and after introduction of the enhanced GLS to better gauge its impact. Therefore, for the majority of crash analyses, a four year window from 2007/08 to 2010/11 was not included in the analyses, due to the appreciable change in licensing trends over this period. In addition, the migration of some young people to later licensing means that the crash evaluation should not only consider the impact separately on those aged 18 to 20 years and those aged 21 to 23 years at licence, but also the impact upon these two age groups combined.

Crash involvement trends

The principal aim of the GLS is to make young drivers safer on Victoria's roads. Accordingly, the main aim of the crash analysis was to assess the impact of the GLS and preceding measures upon the crash involvement of beginning drivers in casualty crashes and in crashes that result in death or serious injury.

The crash analysis comprised six parts, each with specific research questions to be answered and data analysis procedures to address them. The six parts were as follows:

- age at crash involvement over time
- age at crash involvement – before and after comparison
- time since first licence – before and after comparison
- alcohol involvement – before and after comparison
- peer passenger restrictions – before and after comparison
- learner permit holder crash involvements over time.

Crash records were sourced from the VicRoads Road Crash Information System (RCIS) and then linked to licensing information from the DLS. Exposure was defined in terms of '10,000 driver-years', and statistical analyses were confined to those sections of the study that entailed 'before' versus 'after' comparisons. Poisson Regression Modelling was the analysis technique applied – a technique that is capable of comparing crash involvement rates from the pre-GLS to the post-GLS period for the novice group with the corresponding changes for a comparison group, while taking into account the influences of other independent variables, such as age, gender and crash location.

Age at crash involvement

Aim

The primary aim of the age at crash involvement analysis was to determine overall the extent to which a series of measures over time (2001/02 to 2013/14) targeting beginning drivers were successful in reducing (i) their absolute number of crash involvements and (ii) their crash involvement rates.

Method

Crash involvements (casualty and fatal and serious injury (FSI) crashes separately) for drivers aged 18 to 20 and 21 to 23 years for the pre-GLS period 2001/02 to 2003/04 were compared with crash involvements for the three year post-GLS period 2011/12 to 2013/14. The corresponding crash involvements for a comparison group, drivers aged 35 to 42 years, were also derived. The analysis approach was chosen to examine change over the full 13 year period by comparing results from a three year grouping at the start of the period with a three year grouping at the end of the period. Three years was chosen to minimise the impact of any year-on-year variability. No statistical testing was undertaken on this analysis, as absolute crash involvement counts and trends were of interest.

Results

In terms of absolute numbers of crash involvements, the findings show:

- Drops in casualty crash and FSI crash involvements over the 13 year study period were substantially greater for drivers aged 18 to 23 years than for the comparison groups aged 35 to 42 years.
- Reductions were more marked for drivers aged 18 to 20 than for those aged 21 to 23 years at crash involvement.
- Reductions resulted in estimated savings per annum for drivers aged 18 to 20 years of 534 casualty crash involvements and 128 FSI crash involvements relative to the comparison group.

In terms of rates of crash involvement 'per driver-year':

- Casualty crash involvement rates for novice drivers for each year of age, 18 to 23, reduced over the thirteen year study period relative to the rate of involvement of the comparison group.
- FSI involvement rates decreased substantially for 18 year olds and marginally for the other novice ages relative to the corresponding rates for the comparison group.

Discussion

The Safe System approach adopted by the Victorian Government in developing its road safety strategy and action plan (Victoria State Government 2016) under the banner 'Towards Zero' recognises the need to reduce the absolute numbers of deaths and serious injuries occurring on Victoria's roads. Accordingly, the reduced number of young drivers involved in casualty and FSI crashes relative to the comparison group across the study period is a very positive outcome. While differences in exposure between novice and comparison groups, unrelated to introduction of the GLS itself, may have had a modest impact on crash involvement counts, the reduction reflects well on the collective impact on young driver safety of the GLS itself together with the series of measures that preceded it.

With regard to rates of crash involvement, casualty and FSI crash involvement rates dropped more rapidly (in proportional terms) for young drivers than for drivers in the comparison group over the study period. Inspection of the trends suggests that the rate ratios fell quite markedly in the later years of the study period, especially for drivers aged 18 years at licence issue.

Age at crash involvement – before and after comparison

Aim

The main aim of this analysis was to determine how the GLS has affected the crash involvement rates of young drivers whose age at crash involvement was 18 to 20 years and 21 to 23 years.

Method

Casualty crash and FSI crash involvement rates per 10,000 driver-years were compared post-GLS to pre-GLS for the young driver groups relative to the more experienced comparison groups, while taking into account the simultaneous impact of gender, crash location (metro/country) and age at crash involvement (18 to 20 years/21 to 23 years/18 to 23 years). The three-year pre/post periods of 2004/05–2006/07 and 2011/12–2013/14 were chosen to avoid the disruption to licensing trends around introduction of the enhanced GLS and, as far as possible, the progressive shift to later licensing that occurred in the years following the GLS introduction. Results are statistically significant unless indicated.

Results

The key findings regarding age at crash involvement are as follows:

- For drivers aged 18 to 20 years at crash involvement, the group with the highest rates of

involvement, relative to the comparison group:

- their casualty crash involvement rate reduced overall by a significant 13.6% and their FSI involvement rate by a significant 20.3%
- reductions were apparent for both males (18.4% and 14%) and females (23.3% and 13.3%) overall, in metropolitan areas (17% and 16.6%) for both FSI and casualty crash involvements, and in country areas (27.5%) only for FSI crash involvements.
- For drivers overall aged 21 to 23 years, relative to the comparison group:
 - there were no significant changes in the group's overall crash involvement rates
 - the casualty crash involvement rate of female drivers increased by a significant 14.3%, with the increase especially evident in country Victoria (30%)
 - the FSI crash involvement rate of male drivers decreased significantly by 23.4% overall and by 24.4% in the metropolitan area.

Discussion

The analysis showed, that after accounting for the combined influences of gender and region, the casualty crash involvement rate and the FSI crash involvement rate for drivers aged 18 to 20 years at crash reduced by 13.6% and 20.3% overall relative to the comparison group. These results are very positive as it is members of this group who are subject to all the provisions of the GLS and typically experience higher crash rates than their counterparts who are older, more experienced or both. Moreover, the reductions were typically greater for involvement rates in the more severe types of crashes, those that resulted in death, serious injury or both.

For drivers aged 21 to 23 years at crash involvement a different picture emerged with increases in casualty crash involvements for females overall and females in country areas. In contrast, male drivers overall and male drivers in metropolitan areas significantly reduced their FSI crash involvement rates relative to the comparison group. However, it should be noted that post-GLS, some drivers in this age range would have been subject to all the P1 and P2 provisions of the enhanced GLS while others, who obtained their licence at 21 years or later, would have been subject only to the P2 provisions.

The reasons underpinning the disparate trends in crash involvement rates for male and female drivers aged 21 to 23 years are unclear and warrant further investigation. It is reasonable to infer, however, that the GLS and associated measures were influential in improving appreciably the casualty and FSI crash involvement rates of drivers aged 18 to 20 years, the group that experienced the highest crash involvement rates prior to GLS

introduction and was subject to all the provisions of the P1/P2 licence stages under the enhanced GLS.

Time since first licence (experience) – before and after comparison

Aim

The aim of this analysis was to assess how the GLS has affected the crash involvement rates of young drivers whose age at licence issue was 18 to 20 years or 21 to 23 years by differing levels of 'experience' as measured by time since being licensed.

Method

As was the case in the before-after analysis by age at crash involvement, comparisons were made between crash involvement rates post- versus pre-GLS for each novice driver group of interest relative to changes in the corresponding rates for a comparison group. The same time periods (three years) pre and post-GLS as for the 'age at crash' analysis were chosen.

The choice of study period and restrictions on driver membership have resulted in an under-representation of drivers who have held their licence longer – sample sizes were greatest for drivers in their first year of driving and became progressively smaller as experience increased. As a result, a separate calculation was undertaken to estimate the overall change in crash involvement rates had there been equal representation across all four experience levels. Results are statistically significant unless indicated.

Results

Key findings were:

- Casualty crash and FSI crash involvements dropped significantly for drivers aged 18 to 20 years at licence in their first year of driving (19.2% and 21.7% respectively), but not for drivers aged 21 to 23 years at licence.
- Casualty crash reductions for both age groups combined (18 to 23 years) in their first year of driving were evident for both males (18.1%) and females (19.5%), and in both metropolitan (18.9%) and country crashes (17.5%).
- FSI crash reductions for both age groups combined (18 to 23 years) in their first year of driving were evident for both males (20.6%) and in both metropolitan (15.1%) and country crashes (29%) (with the reduction for females being the only non-significant result for FSI crashes).
- There were no significant differences in rates post- versus pre-GLS relative to the comparison group for drivers in their second or third year of driving, nor for drivers in their fourth year of driving involved in FSI crashes.

- Casualty crash involvement rates for drivers aged 18 to 23 years at licence in their fourth year of driving increased by 18.2% overall with other significant increases noted for drivers licensed at 18 to 20 years (17.1%), female drivers (28.3%) and for crashes that occurred in the metropolitan area (22.7%).
- By adjusting for the under-representation of more experienced drivers in the study sample, it was estimated, if the current change in crash involvement rates stayed firm, drivers aged 18 to 20 years at licence combined across their first four years of driving would experience reductions in casualty and FSI involvement rates of 5.9% and 9.8%, respectively.

Discussion

The analysis points to a very substantial reduction in both casualty and FSI crash involvement rates for drivers aged 18 to 20 years at licence in their first year of driving, the group who experienced the additional restrictions that applied only to P1 drivers post introduction of the enhanced GLS. These include the peer passenger restriction, the non-use of mobile phones and the requirement to achieve at least 120 hours of supervised driving practice as a learner driver. Significant reductions in both casualty and FSI rates applied in both metropolitan and country areas, for male drivers, and for females involved in casualty crashes only. In all probability, introduction of the GLS has been influential in bringing about these substantial reductions in crash involvement rates among first year drivers.

The benefits did not extend into the second and third years of driving and there was a significant increase in the casualty crash involvement rate (though not in the FSI rate) for fourth-year drivers. This increase cannot be explained in terms of the direct impact of the range of safety measures introduced as part of the enhanced GLS. It is worth noting that fourth year drivers in the study post-GLS would have been licensed early during the transitional phase following introduction of the GLS. As a result, the composition of this cohort may well differ from that of a cohort with similar driving experience, but who were licensed once the transitional phase had concluded.

Nonetheless, it is important to note that rates of involvement of fourth year drivers within the post-GLS period were substantially lower than the rates for first-year drivers. Drivers in their first year, aged 18 to 20 years at licence, had the highest crash involvement rates prior to GLS introduction and were the group to experience substantial reductions in rates for both casualty and FSI crash involvement rates with the introduction of the GLS.

In order to estimate the impact of the changes in rates across all four experience levels combined, equal representation of each experience level was assumed. The calculation

estimated that, for drivers in their first four years of driving and licensed in the age range 18 to 20 years at licence, casualty crash involvement rates would reduce by 5.9% and FSI involvement rates by 9.8%.

The GLS in all likelihood has been very influential in improving the safety of beginning young drivers, those aged 18 to 20 years at licence in their first year of driving.

Alcohol involvement - before and after comparison

Aim

This analysis aimed to determine how effective the GLS was in reducing alcohol-related crash involvement rates among fourth-year drivers who were licensed at 18 to 20 years.

Method

Under the enhanced GLS provisions, a probationary driver who is aged 18 to 20 years at licence is subject to a zero blood alcohol law for four years, compared with three years pre-GLS. The equivalent fourth-year driver pre-GLS would (mostly) have been a driver in his first year of a full licence and so be subject to a blood alcohol limit of 0.05 g/100 ml.

In the absence of sufficient blood alcohol data available for drivers involved in casualty crashes, crash involvements during 'high alcohol hours' (HAH)³ were analysed as a substitute. Both casualty and FSI crash involvement rates during HAH times were compared between the pre-GLS and post-GLS periods for fourth-year drivers aged 18 to 20 years at licence relative to a comparison group comprising more experienced drivers but licensed in the same age range. Additional analyses were conducted in which groups were broken down by gender, crash location and by crash type (single-vehicle/other). Two-year study periods pre and post-GLS were chosen to avoid the pre-GLS period straddling the time at which new penalty provisions were introduced for drivers under the age of 26 years convicted of a drink-drive offence.

Results

The analysis provided the following results for drivers aged 18 to 20 years at licence in their fourth year of driving:

- The overall change in casualty crash involvement rate during HAH times was a non-significant reduction of 9.4%.
- Casualty crash involvement rates during HAH times reduced by a significant 19.9% in

³ A surrogate for Blood Alcohol Concentration (BAC) that measures when people are most likely to be driving under the influence of alcohol.

the metropolitan area, and in particular for males and for single-vehicle crashes.

- Small sample sizes coupled with the use of the proxy measure for crashes involving alcohol (HAHs) meant that the ability of the statistical testing to discern significant changes was very limited.

Discussion

The almost total lack of statistically significant results for this study component is likely to be attributable at least in part to small sample sizes as a result of:

- the limited study period windows of two years
- the focus on drivers within a single year of experience only
- the relatively low crash involvement rate of fourth year drivers compared with their less experienced counterparts
- examination of a subset of casualty crashes and of FSI crashes, those that occurred during HAH hours only.

The estimated change in the HAH casualty crash involvement rate for fourth year novices, though not statistically significant, was a favourable 9.4% reduction, with a significant 19.9% reduction in Metropolitan Melbourne. Support for this result was provided by the survey of probationary drivers that showed a halving of self-reported drink-driving among fourth-year drivers post compared with pre-GLS.

Peer passengers – before and after comparison

Aim

This analysis aimed to determine how effective the GLS was in reducing the rate of crash involvements with two or more peer passengers for first year P1 drivers.

Method

A pre-post GLS comparison was conducted relative to a more experienced comparison group for drivers aged 18 to 20 years at licence in their first year of driving while accounting for number of passengers, gender and crash location. Results are statistically significant unless indicated.

Results

The analysis found for drivers aged 18 to 20 years at licence and in their first year of driving:

- The rate of casualty and FSI crash involvements with two or more peer passengers dropped very substantially relative to the comparison group - by 69.8% for casualty and

69.2% for FSI crash involvements.

- Large reductions in rates applied to both males (70.4%) and females (65.6%) and in metropolitan (74.4%) and country (58.8%) areas.
- There were significant reductions in casualty crash involvement rates while carrying no peer passenger (9.1%) and while carrying one peer passenger (12.0%) with the sub-categories of females and crash involvements in Metropolitan Melbourne also registering statistically significant reductions in both these passenger categories.

Discussion

The results of the analyses point to a very substantial impact of the requirement that first-year P1 drivers carry only one peer passenger. The rates of involvement of first-year drivers in both casualty and FSI crashes with two or more peer passengers have reduced by more than 60%. The reduction in crash involvements of first-year drivers carrying two or more peer passengers makes a significant contribution to the overall reduction in casualty crash involvements of first year drivers aged 18 to 20 years at licence. The results accord with the findings of the probationary driver surveys where reduced rates post-GLS of carrying two or more passengers were reported.

Learner permit holders – time series

Aim

This analysis determined if there has been an increase over time in crash involvements of learner permit holders as a result of increased levels of on-road exposure from the requirement to achieve a minimum 120 hours of supervised practice if licensed under 21 years of age.

Method

Crash involvement rates per 10,000 driver years were calculated by financial year over time for learner permit holders. Rates were calculated for all casualty crash involvements and for FSI crash involvements and trends observed over the 13 year period 2001/02 to 2013/14. No statistical testing was undertaken, as absolute learner permit and licensing counts and trends were of interest.

Results

The key findings were:

- Casualty and FSI crash involvement rates for learners trended generally downwards over the study period and were fewer post-GLS than pre-GLS.

- Supervised and unsupervised drivers made similar contributions to the number of crash involvements each year.
- The total contribution of learner drivers to overall young driver crash involvements is very small compared with the crash rates for novice and experienced drivers.

Discussion

In assessing the overall impact of the GLS and the related safety measures that preceded its introduction, the contribution of learner drivers to total young driver crash involvements continued to be very small with crash rates trending generally downward over the study period.

Discussion

The weight of evidence points to the enhanced GLS together with the suite of measures that preceded its introduction having made a significant contribution to improving the safety of young drivers on Victoria's roads. While it has not been possible to tease out the individual impact of all components of the package of measures, components such as the P1 passenger restriction, the extended learner permit period and the 120 hour requirement were able to be assessed separately.

Reductions in crash rates, measured on a 'per driver-year' basis, were evident for drivers aged 18 to 20 years at involvement in both casualty crashes (13.6%) and FSI crashes (20.3%) relative to the comparison group. Similar reductions were observed for drivers aged 18 to 23 years at licence in their first year of driving with drops in their casualty and FSI crash involvement rates of 18.7% and 19.4% respectively. Drops were significant for both metropolitan and country crashes as well as for both males and females involved in casualty crashes. It was the subgroup of first-year drivers aged 18 to 20 years at licence, and so subject to all of the new provisions of the GLS, who made the biggest contribution to these rate reductions.

The peer passenger restriction was successful in substantially reducing the rate of casualty crash involvement (69.8%) and FSI crash involvement (69.2%) of first year drivers while carrying two or more peer passengers. Once again, reductions applied to both males and females and for crashes that occurred both in metropolitan and country areas of Victoria. These results were borne out by findings of the probationary driver survey in which self-reported carriage of multiple peer passengers by P1 drivers fell significantly after the introduction of the enhanced GLS.

The choice of study periods has meant that when combining crash involvements across years of experience, those with more experience are under-represented in the combined total. As a consequence, by adjusting for this under-representation, it was estimated that in the longer term drivers aged 18 to 23 years at licence and in their first four years of driving would experience reductions of 5.1% and 9.3% in casualty and FSI crash involvement rates respectively.

There are several mechanisms that were influential in improving the safety of beginning young drivers:

- The promotional and educational safety measures that were introduced over the decade leading up to GLS introduction resulted in the early achievement of the minimum 120 hours of supervised practice by those aged 16 years and the steady improvement in practice hours over the period for those aged 17 years and, to some extent, those older at learner permit issue.
- The direct impact of the specific measures introduced as part of the GLS:
 - the 120 hour requirement itself together with a 12 month minimum learner permit tenure and a new challenging Drive Test that collectively supported continued improvement in learner practice hours and postponement of age at licence to later within the 18 to 20 year range
 - the peer passenger restriction and its direct safety impact
 - the extension of the zero blood alcohol requirement to the fourth year of the enhanced GLS.
- The indirect impact of the enhanced GLS including an extended learner permit period and 120 hour requirement that resulted in a shift in licensing age to later years with especially marked increases in numbers taking out their first licence at age 21 years or older. This resulted in the benefit of reduced exposure during the intervening years before licensing and reduced risks as young people are more mature at licensing.

The impact of the GLS on crash involvement rates appears to be greatest for drivers licensed at ages 18 to 20 years in their first year of driving, the year in which they must first pass through an enhanced 'gateway' that includes an evidence-based Drive Test, and then experience a range of GLS provisions including the peer passenger restriction and a ban on all mobile phone use. These drivers also experience the immediate benefit of the minimum 120 hours of driving practice requirement, which provides a crash protective effect for drivers during the first year of driving after getting a solo licence (Gregersen 1997).

With a view to assessing the true impact of the GLS upon crash involvements, reasonable precautions were taken to avoid those years immediately leading up to and following the

introduction of the GLS in conducting the analysis comparing 'before' with 'after' crash involvement rates. A spike in licences issued preceded the GLS with a corresponding dip in licences issued in the first year of the GLS. The migration of some young people to taking out their licence at a later age has meant that a new 'equilibrium' in licence age profile can only be established after some years have passed. Accordingly, 'before' and 'after' periods for comparing crash involvement rates were chosen to account for these influences as far as possible.

Evaluations in the real world inevitably involve making a number of assumptions, key among them being the choice of comparison group. The comparison group serves the purpose of reflecting changes that have occurred in the external environment that would equally affect the crash involvement rates of the comparison and the novice group. Any differences that occur in the change of rates between the two groups can then be attributed to measures directed at the package of GLS measures to improve young driver safety alone. While every effort has been made to choose comparison groups that reflect this requirement, there is no guarantee that the outcome has been totally successful. For example, it is conceivable that changes in enforcement activity and the rapid improvement in vehicle technology over the study period have differentially affected the novice and comparison groups. Moreover, the change in licensing age profile following GLS introduction could mean 'like with like' is no longer being compared, for example, drivers aged 18 to 20 years post-licence may exhibit characteristics different to their equivalents pre-GLS. For instance, they may have less access to public transport and require a car to travel for all purposes with an increased relative exposure to crash risk the result. The exposure measure used in this evaluation of 'driver-years' does not account for changes in time on-road, nor distances travelled.

It is for these reasons that no definitive 'cause – effect' relationships can be reported. Nonetheless, the weight of evidence pointing to the positive influence of the enhanced GLS and the preceding supporting measures is appreciable.

Conclusion

The enhanced GLS together with the suite of measures that preceded its introduction were very influential in enhancing the safety of young drivers on Victoria's roads. The evidence strongly points to the GLS together with the preceding suite of measures to promote increased learner practice and reduced risk taking having been very influential in improving the safety of beginning young drivers, especially those aged 18 to 20 at licence and in their first year of driving. The new provisions for learner and P1 drivers within the enhanced GLS have made valuable contributions to improving the safety of beginning drivers.

BACKGROUND

Overview of the Graduated Licensing System program

Victoria has one of the safest road transport systems nationally and worldwide. However, in the early 2000s despite recent reductions in the Victorian road toll, young drivers aged 18 to 25 years continued to be greatly over-represented in road crashes in comparison with older, more experienced drivers. Probationary drivers were involved in crashes at triple the rate of experienced drivers when kilometres travelled were considered (VicRoads 2005). Further, newly licensed first year probationary drivers operated at the highest risk.

VicRoads reviewed international evidence relating to the young driver problem and found that a more comprehensive graduated licensing system (GLS) could be expected to offer worthwhile reductions in novice driver crash involvement. As a result, VicRoads introduced an enhanced GLS during 2007 and 2008. Shortly before the GLS introduction, one-third of the road toll resulted from crashes involving drivers aged 18 to 25 years, with approximately 90 people killed, 2,200 seriously injured and more than 6,000 injured each year (Healy et al. 2012).

Victoria's first formal GLS was introduced in 1990. It introduced, among other initiatives, longer learner permit periods, reinstatement of the three-year probationary period (which had been reduced to two years in May 1987) and a passenger restriction accompanied by an extended probationary period for offenders whose licence is cancelled or suspended in the first 12 months. However, Victoria had previously introduced some components of a GLS, including:

- a three year probationary licence (introduced 1964)
- P-plates and a 50 mph (80 km/h) speed limit for first-year probationers (1969)
- learner permits (1970)
- a zero BAC for the first two years of a probationary licence (1984) (NRMA 1988).

Before the introduction of Victoria's enhanced GLS during 2007 and 2008, as part of a community consultation process, a *Young Driver Safety Discussion Paper* was released by VicRoads in 2005 with some 400,000 brochures distributed in a number of community languages. In addition, 26 community discussion sessions were held. The process resulted in strong community support being posted for the measures proposed for the enhanced GLS.

Against a background of strong community support, the enhanced GLS was introduced progressively in three phases commencing in 1 January 2007 with the final phase introduced on 1 July 2008. Its central purpose was to tackle the over-representation of young drivers in serious crashes. The key objective of the enhanced GLS is to introduce young drivers into driving gradually through a safer, evidence-based graduated system. The GLS aims to address the key crash risks and behavioural issues for this group, and to encourage young drivers to adopt critical safety behaviours.

A range of important supporting measures to influence and reinforce desired behaviour change were also implemented in the years leading up to GLS introduction. From the mid-1990s VicRoads provided targeted programs and materials to assist novice drivers, parents and driving instructors. In addition, the Transport Accident Commission (TAC) conducted a series of mass media public education programs accompanied by direct mail encouraging learners and their parents to obtain a minimum 120 hours of practice while highlighting the elevated risks for beginning drivers. Other programs were also introduced such as the Year 11 Fit2Drive (F2D) behaviour change program in 2002 to help keep passengers of probationary drivers safe. Information on the current suite of support programs can be found in Appendix A – Young driver support programs.

The first phase of the enhanced GLS introduced on 1 January 2007 included:

- alcohol interlock requirements for probationary drink-drivers under the age of 26 as a condition of licence restoration
- compulsory carriage of licence for all drivers under the age of 26.

The second phase, introduced on 1 July 2007, included:

- a minimum 12 months learner permit period and a minimum 120 hours on-road supervised driving experience (including at least 10 hours at night) as a learner (for those aged under 21 years at the time of licensing)
- a requirement to carry the learner permit when learning to drive
- a ban on any mobile phone use when learning to drive
- new high-powered vehicle restrictions for P-platers.

The final series of measures of the enhanced GLS, introduced on 1 July 2008, comprised:

- an increased probationary period from three to four years (P1 for one year and P2 for three years) for those licensed 18 years to 20 years, while those licensed at 21 years or over move straight to P2
- a ban on any mobile phone use by P1 drivers
- a ban on towing by P1 drivers (unless for work or if under instruction)

- a requirement for a good driving record (no offences committed that lead to driving bans served) to graduate from P1 to P2 and to graduate from P2 to a full licence
- a restriction on P1 drivers from carrying more than one peer passenger (aged between 16 and 21 years) other than family members, except when accompanied by a fully licensed driver (as is the case for learner drivers).
- extension of the zero blood alcohol requirement from three to four years aligned with the P1 and P2 licences.

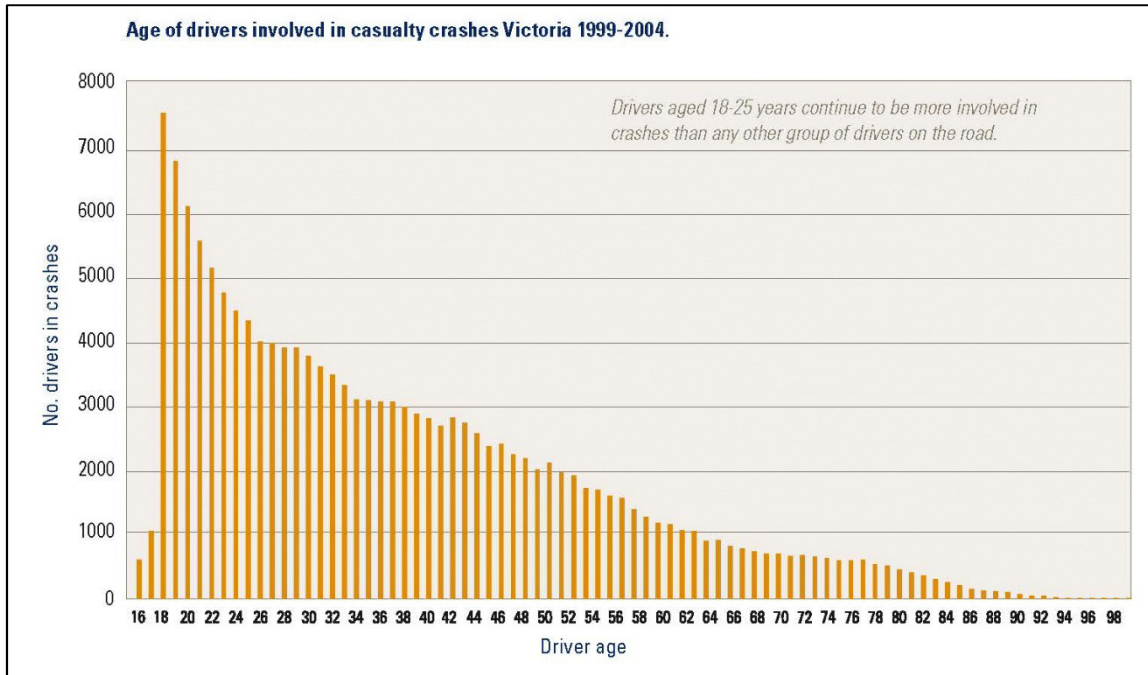
On 1 July 2008, a new 30 minute on-road Drive Test was also introduced to help identify drivers whose skill level is consistent with having satisfied the 120 hour practice requirement and can demonstrate safe driving capabilities for driving solo. The Drive Test is longer and more challenging than the previous test. It requires licence applicants to demonstrate safe driving skills in a wide range of traffic environments.

The changes to the GLS were expected to result in changes in the accumulation of experience by learner permit holders, changes in the exposure of novice drivers to risk and a reduction in risky driving behaviours by probationary drivers, resulting in a reduction in their casualty crash involvement. A comprehensive evaluation, using data from a variety of sources, was performed to assess whether the changes to the GLS would be successful in achieving the aims for which they were designed and to monitor any other changes in behaviour and offence and crash outcomes that may have resulted. This report sets out the findings from that comprehensive evaluation.

Impetus for the GLS

Victoria achieved substantial reductions in deaths and serious injury in the years leading up to GLS introduction and beyond as a result of several important evidence-based measures introduced under successive road safety strategies. The road toll dropped from 444 deaths in 2001 to 337 in 2006 before the enhanced GLS was introduced, and was 252 deaths in 2015 and 291 deaths in 2016.

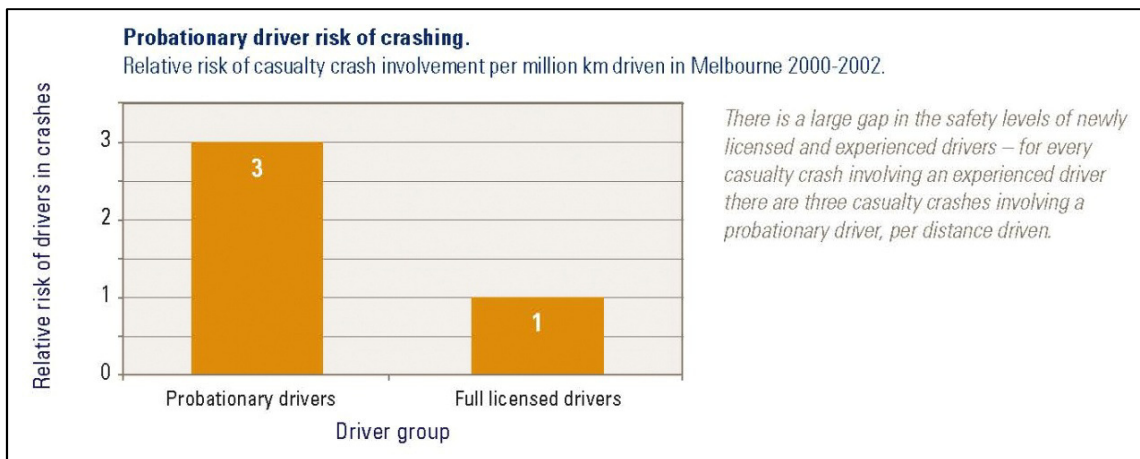
Despite these dramatic improvements, young and inexperienced drivers remained significantly over-involved in casualty crashes compared with their older more experienced counterparts during the period leading up to the GLS (Figure 1).



Source: VicRoads Young Driver Safety and Graduated Licensing Discussion Paper

Figure 1: Age of Victorian drivers involved in casualty crashes 1999 to 2004

In fact, probationary drivers in the years leading up to the GLS were involved in casualty crashes (fatal, serious and other injury crashes) at triple the rate of experienced drivers (Figure 2).



Source: VicRoads Young Driver Safety and Graduated Licensing Discussion Paper, based on Drummond, 2004

Figure 2: Probationary driver risk of crashing

It was against this background of a continuing, significant over-representation of young and inexperienced drivers in casualty crashes and associated costs that the potential for an enhanced GLS was assessed.

Evidence for a GLS as an effective intervention

A GLS is founded on the proposition that the safety of novice drivers will be significantly improved by a structured approach in which novice drivers are exposed in a graduated

manner to increasingly demanding driving settings as their experience and skills develop. New Zealand, Canadian provinces and most US states have GLSs. Key features of these systems have included extended supervised learner periods, passenger restrictions with exemptions, late night driving restrictions with exemptions, zero blood alcohol limits and progression through licensing stages contingent on good driving records. The licensing age in most of these jurisdictions can be as low as 16 years. Crash reductions were experienced in these jurisdictions (Begg & Stephenson 2003; Shope 2007; Williams et al. 2012).

Apart from the overall impact of GLSs, research and evaluation studies pointed to the following components as important means of reducing the potential for beginning drivers to be involved in crashes:

- extended learning periods and increased supervised on-road driving practice as a learner to build up experience and safe driving capabilities to better meet the demands of solo driving
- decreased distractions and reduced workloads at a time when the driver is just beginning to develop key safe driving capabilities
- reduced exposure at a time when drivers are operating at very high risk
- increased motivation to drive safely through the requirement for a good driving record to progress to a full licence.

As a result of a comprehensive review of the literature, an analysis of crash trends in Victoria together with consultation with key international experts in the fields of young driver safety and evaluation, an enhanced GLS was proposed. It comprised a package of integrated measures that the best available evidence pointed to as an influential means of improving the safety of novice drivers in Victoria.

THE GLS PROGRAM

Introduction

Changes to the 1990 GLS were made in 2006 (support programs only), 2007 and 2008. The enhanced GLS and support programs aim to improve young driver safety by:

- increasing the base level of experience to better equip learners with the capabilities needed to drive solo
- assessing the key safe driving capabilities required to drive solo in a variety of common driving conditions
- reducing driving exposure, especially as it represents a high risk for novice drivers
- increasing awareness of key risks and actively supporting adoption of personal safety strategies to manage risks
- providing motivation for safe driving behaviour and deterring speeding and other high risk driving behaviour
- promoting responsible and safe practices by younger drivers, including to not drink and drive, and to not drive unnecessarily at night
- promoting the purchase of safer vehicles by young drivers.

The enhanced GLS requirements for learners and probationary licence holders are described in the following sections.

Requirements for learner permit holders

The requirements of learner permit holders are as follows (if the requirement was introduced as part of the enhanced GLS, an introduction date is provided):

- The learner is subject to a zero BAC, must be supervised by a fully licensed driver with a BAC under 0.05, must display L plates, is not permitted to tow, and five or more demerit points in a 12 month period or 12 or more points in three years will result in a permit suspension.
- The learner permit must be carried at all times when driving (introduced 1 July 2007).
- No mobile phone, whether hand-held or hands-free, may be used while driving (introduced 1 July 2007).

Requirements to obtain a probationary licence

In order to graduate from a learner permit to a probationary licence, learner drivers who are aged less than 21 years at the time of applying for a probationary licence are now required to:

- have held the learner permit for at least 12 months (up from 6 months previously)

- present the official VicRoads Learner Log Book signed by the learner and supervisor showing that the learner has acquired at least 120 hours of supervised driving experience, including at least 10 hours driving at night.

These new requirements apply to drivers who obtained a learner permit from 1 July 2007 onwards.

Other requirements in force before 1 July 2007 for learners applying for a probationary licence (minimum age 18 years and pass the Hazard Perception Test) continue to apply.

All learners applying for a probationary licence, regardless of age, are required to pass the on-road Drive Test. This new test was introduced on 1 July 2008 and replaced the POLA (Programmed Observation Licence Assessment) test that had been in place since 1994. A large-sample trial of the test (1,300 learners over three stages of test development) showed that it provides a reliable assessment of driving experience and safety-related driving ability. The Drive Test discriminates reliably between learners with more than 120 hours experience and those with less experience (less than approximately 80 hours) (Cavallo & Oh 2008).

Requirements for probationary licence holders

From 1 July 2008, the probationary licence period was divided into a P1 stage of at least one year and a P2 stage of at least three years. Drivers aged under 21 years when acquiring a probationary licence are required to complete the P1 stage before entering the P2 stage, which means the time spent on a probationary licence increased from the previous three years to at least four years for these drivers. Drivers aged 21 years or more when acquiring a probationary licence go straight to the P2 stage without first completing a P1 stage.

Drivers in the P1 stage are subject to all of the previous probationary licence requirements: zero BAC, compulsory carriage of licence, requirements to display P plates, requirement to drive only automatic vehicles if tested in an automatic vehicle, and five or more demerit points in a 12 month period or 12 points in three years will result in a licence suspension. P1 drivers are also subject to the following new requirements:

- No more than one peer passenger (16–21 years) may be carried.
- No mobile phone use, whether hand-held or hands-free, is permitted while driving.
- Towing is not permitted (unless for work or under instruction).
- Certain high-powered vehicles may not be driven.

Any licence suspension (as a result of a court conviction, Traffic Infringement Notice (TIN) or demerit points), drink-driving offence with BAC less than 0.05 or drug-driving offence will result in an extension of the P1 period by six months plus the period of the suspension, and a passenger restriction will be applied for the balance of the P1 period.

Drivers in the P2 stage are subject to all of the requirements in effect before 1 July 2008 (zero BAC, compulsory carriage of licence, requirements to display P plates), plus restrictions on driving high-powered vehicles. Drivers remain in the P2 stage for at least three years before graduating to a full licence. Any licence suspension (as a result of a court conviction, TIN or demerit points), drink-driving offence with BAC less than 0.05 or drug-driving offence will result in an extension of the P2 period by six months plus the period of the suspension.

Victoria first introduced high-powered vehicle regulations for probationary drivers in 1990. This prohibited probationary drivers from driving vehicles with:

- a power to mass ratio which exceeds 125 kilowatts per tonne, or
- an engine capacity which exceeds 3.5 litres per tonne of the unladen mass (tare) of the motor vehicle.

However, this was difficult for drivers to calculate and difficult to enforce so a simpler system was brought in based on engine characteristics on 1 July 2007. This prohibited probationary drivers from driving vehicles with:

- an engine that has eight or more cylinders, or
- a turbocharged or supercharged engine (except diesel powered vehicles or exempted low powered turbo vehicles), or
- an engine that has been modified to increase the vehicle's performance (other than a modification made by the manufacturer in the course of the manufacture of the vehicle), or
- a nominated high performance six cylinder engine.

Penalties for drink-driving offences

There were two changes to penalties for drink-driving offences:

- Any probationary licence holder and any full licence holder aged less than 26 years who is convicted of a drink-driving offence with a BAC greater than or equal to 0.07 g/100 ml, even if it is the driver's first drink driving offence, will be required to fit an alcohol ignition interlock to their vehicle for at least six months when relicensed.
- Any full licence holder aged less than 26 years who is convicted of a drink-driving offence with a BAC greater than or equal to 0.05 g /100 ml will have their licence cancelled.⁴

These changes came into effect on 1 January 2007.

⁴ On 1 October 2014, the drink-driving laws were strengthened to require every first offender who has a learner permit or probationary licence to fit an interlock.

Support programs

As referenced earlier, from 1994 steps were taken by the road safety agencies to encourage learner driver practice and decrease risk taking among novice drivers. Some key support programs from 1994 to 2006 included:

- Local community groups were encouraged to promote the benefits of increased learner practice in their communities from 1994.
- VicRoads released the *Getting There: From Ls to Ps* booklet in February 1998. The booklet set out the stages of learning to drive and provided a log book. It is now known as the *Learner Kit*.
- *Keys Please* for Year 10 students and their parents, a seminar on learning to drive, was developed by VicRoads in 1998 (still in operation).
- TAC mass advertising and public education programs (television, radio and print media) on the theme 'Your kids need experience, not excuses' were conducted in the late nineties to increase supervised learner practice to a minimum 120 hours.
- In parallel with the public education, a 'scratchy' card was provided to every new learner permit holder to encourage keeping a tally of hours logged up in supervised driving practice.
- In the early 2000s, the 'scratchy' was replaced by an information kit to all learners covering the importance of logging practice and how some of the barriers to practice could be overcome; a log book formed part of the kit.
- The Year 11 *Fit2Drive (F2D)* program was introduced from 2002 (still in operation); this program encourages passengers to adopt safe strategies when accompanying new drivers. More recently, it also incorporated safe strategies for drivers.

The GLS package announced in June 2006 included the following new or improved support programs for learner permit holders:

- a publicity campaign (print and online media) targeting newly licensed drivers about the changed GLS rules
- a new 120 hour *Learner Kit* with a Learner Log Book (commenced July 2007)
- expansion of the *Keys Please* parent-learner program (commenced July 2007, and altered to a learner program in 2012 with the provision of an online video resource on the VicRoads website for parents, known as *Lessons from the Road*)
- expansion of the *Lsite* interactive web site (some improvements made mid-2007, further improvements undertaken in 2011 and updates in 2014)

- updated guidance from VicRoads to commercial driving instructors regarding the new requirements for learner permit holders and probationary licence candidates (delivered mid-2007) and the on-road Drive Test (delivered March 2008)
- introduction of the *L2P - Learner Driver Mentor Program*, a community-based volunteer mentor program to assist disadvantaged learners to get a minimum 120 hours of supervised driving experience (pilot programs commenced in 2007, and since mid-2008 it has been available in most municipalities across Victoria)
- the *Probationary Kit* (released 1 July 2008) provided to all probationary drivers when they obtain their licence to encourage them to minimise their risks, e.g. by driving less at night and not carrying multiple passengers (includes a brochure for probationary drivers and a separate brochure for their parents).

Further details on support programs are outlined in Appendix A – Young driver support programs.

APPROACH TO AND OBJECTIVE OF THE GLS EVALUATION

A critical element of the GLS program is its evaluation. Given the level of investment in the program and the substantive changes that were introduced into the licensing system as part of the new program, great care was taken in developing an evaluation design to validly and reliably measure the most important indicators of program success.

A panel of international experts (involved in evaluating graduated licensing initiatives in overseas jurisdictions) was consulted in 2007 to ensure that best practice was adopted. Statistical experts were also consulted to ensure the statistical methods used in the offence and crash evaluations were sound and valid.

The aim of the evaluation was to compare the road safety situation in Victoria following the GLS changes with the road safety situation that would have existed if the changes had not been made. In order to allow for the changing influence of external factors (such as the economy, enforcement patterns and road safety campaigns) between the before and after periods, the evaluation included comparison driver groups that were as closely matched as possible to the novice (intervention) driver groups that exhibit the consequences of the GLS changes. Exposure based on number of drivers and time holding a licence was also controlled for in the offence and crash analyses.

The GLS was introduced across 2007 and 2008. The data collection commenced in 1999 when the first survey on learner driver practice behaviour was undertaken, and was completed at the end of 2013/14 when the last crash data were collected. The final statistical analyses were completed in June 2016.

The approach to the evaluation reflected the need to understand both the overall trends in offence and crash numbers involving novice drivers as well as, via learner and probationary driver surveys, the behavioural responses to each of the influential components introduced as part of the enhanced GLS. This assessment needed to allow for possible variations over time in enforcement and learner permit and licensing trends.

The evaluation was guided by a series of questions sitting under the following eight topic areas:

- crashes
- offences
- learner permit and licensing trends
- learner driver supervised practice

- carriage of peer passengers
- drink-driving behaviour
- speeding behaviour
- other behaviours and requirements (e.g. mobile phone use).

Five sources of data collected before and after the introduction of the GLS were used to help answer key evaluation questions. These data sources included:

- **crash involvement counts and rates:** rates and involvement in fatal and serious injury (FSI) and casualty crashes⁵, using comparison groups
- **offence rates:** offence rates, using comparison groups
- **learner driver self-reported experience:** a series of surveys (using independent samples of drivers) about learner driver experience
- **probationary self-reported driver behaviour:** a series of surveys (using independent samples of drivers) and longitudinal surveys (following a cohort of drivers) about probationary driver behaviour
- **learner permit and licensing trends:** patterns in the issue and tenure of learner permits and licences.

The evaluation was a multistage study with different components being undertaken by different authors at different times. Consequently some of the sections use different study designs. These differences are shown in Table 1 and Table 2.

⁵ Casualty crashes are fatal, serious (taken to hospital) and minor injury crashes.

Table 1: GLS evaluation topic areas – evaluation questions, components and methods

Topic area	Evaluation question(s)	Evaluation component(s)	Methods
Crashes (overall)	Was the enhanced GLS successful in reducing the absolute number of young driver crash involvements?	Crash involvement trends	Age (18 to 20 years, 21 to 23 years, 18 to 23 years and 35 to 42 years) at crash involvement before and after the GLS. Graphs of age at crash involvement over time (individual ages 18 to 23 and 35 to 42 years [the comparison group]).
	Did the enhanced GLS have an overall reduction effect on crash rates of young drivers?	Age at crash involvement: before and after comparison Time since first licence issue (experience): before and after comparison	Changes in casualty crash involvement rates for young drivers exposed and not exposed to the enhanced GLS using a fully licensed comparison group. Undertaken for age at crash involvement (18 to 20 years, 21 to 23 years, 18 to 23 years) and experience level (time since first licence: 0, 1, 2 and 3 years) at crash involvement (for age groups 18 to 20 years, 21 to 23 years, 18 to 23 years). Crash rates defined as the number of crash involvements per 10,000 driver-years of licence holding (this controlled for exposure). For age at crash involvement analyses included a comparison group of fully licensed drivers (experienced, aged 35 to 42 years, with first licence issued at age 18 to 23 years) and for experience level analyses (experienced, aged 30 to 41 years, with first licence issued at age 18 to 23 years) The pre and post-GLS periods differed according to Table 2, but were generally 2004/05 to 2006/07 (3 years) and 2011/12 to 2013/14 (3 years) respectively. Poisson Regression Modelling (PRM) ⁶ was adopted for the statistical analysis. PRM was used to compare the change in crash involvement rate from the pre-GLS to the post-GLS period for the novice groups with the corresponding change for the comparison group, taking into account the influences of all other independent variables, such as age, gender, crash location etc.
Offences (overall)	Did the enhanced GLS have an overall reduction effect on offence rates of young drivers?	Trends in rates of offending	Changes in offence rates for young drivers exposed and not exposed to the enhanced GLS (18 to 20 years and 21 to 24 years), as well as relevant enforcement trends. Again, a fully licensed (experienced) comparison group was used with drivers who were licensed at 18 to 20 years with 10 to 13 years of experience and those

⁶ PRM is a multivariate statistical technique that is suited to the analysis of both count data and rates. This technique was recommended by a statistical expert.

Topic area	Evaluation question(s)	Evaluation component(s)	Methods
			<p>licensed at age 21 to 24 years with 10 to 12 years of experience. The novice driver groups in the analysis are therefore described as:</p> <p>Novice Group 1:</p> <ul style="list-style-type: none"> • Victorian licence issue age 18–20 years • drivers in each of their first four years of driving since licence at date of offence • drivers aged 18/19/20/21/22+ years at date of offence. <p>Novice Group 2:</p> <ul style="list-style-type: none"> • Victorian licence issue age 21–24 years • drivers in each of their first three years of driving since licence at date of offence • drivers aged 21/22/23/24/25+ years at date of offence. <p>The pre-GLS period was 1/7/2004 to 30/6/2008 (four years) and the post-GLS period was 1/7/2009 to 30/6/2013 (four years).</p> <p>Offence rates were expressed as the number of offences per 100 driver-years of licence holding.</p> <p>In order to test for statistical significance, the calculation of odds ratios was undertaken and these were converted to Z-scores. The Z-scores compared changes for the novice groups with changes for the corresponding experience groups.</p>
<p>Learner permit and licensing trends</p>	<p>Did the introduction of the enhanced GLS influence learner permit and licensing trends in the short and long term?</p> <p>Did licensing trends around the enhanced GLS need to be taken into account when designing the crash evaluation?</p>	<p>Learner permit and licensing trends</p>	<p>Analysis of the changes that have taken place in learner permit tenure and in licensing trends arising from the introduction of the enhanced GLS. Trends (counts of first learner permits and first licences on issue) were analysed from 1991/92 to 2013/14 and many graphs were produced.</p> <p>These analyses were used to guide the design of the crash analysis, in particular the years of data analysed pre and post GLS⁷.</p>

⁷ Note that the learner permit and licensing trends analysis was undertaken after the offence analysis, therefore the offence analysis was designed slightly differently to the crash rates analysis, which was able to take into account changes in these trends.

Topic area	Evaluation question(s)	Evaluation component(s)	Methods
Supervised learner driver practice	Did the amount of supervised learner driver practice hours increase over time to at least 120 hours, the prescribed enhanced GLS minimum?	Learner Monitor Surveys	<p>A series of telephone surveys of learner drivers⁸ under the old and enhanced GLS regarding learner driver experience, crashes, exposure and driving behaviours. Surveys occurred in 1999, 2000, 2004, 2005, 2007, 2008, 2009, 2010 and 2014.</p> <p>Each of these cross-sectional surveys included:</p> <ul style="list-style-type: none"> • approximately 1300 learner drivers, to collect information about three stages of learning to drive • approximately 200 drivers who had recently obtained their probationary licence, to obtain information about their preparation in the three to four weeks leading up to the Drive Test (the final stage of learning to drive).
	Did learner driver crashes, supervised and unsupervised increase due to increased driving exposure from the requirement to achieve a minimum 120 hours of supervised practice if licensed under 21 years of age?	Crash involvement trends: learner permit holders time series	<p>A time series analysis, from 2001/02 to 2013/14 (13 years) of supervised and unsupervised learner driver crashes. Learner permit holders within the first six years after issue of the permit during the study period (no maximum age applied) were included. Supervised and unsupervised crash rates (per 10,000 learner permit years) were analysed.</p>
The carriage of peer passengers by P1 drivers	Did the enhanced GLS have an overall reduction effect on P1 drivers self-reports of carrying more than one peer passenger?	Probationary Driver Surveys	<p>A series of surveys of probationary drivers (internet with follow-up using telephone) under the old and enhanced GLS regarding learner and probationary driver experience, crashes, exposure and driving behaviours. A combination of cross-section surveys (independent samples of drivers, a series of four in total) and longitudinal surveys following a cohort of young drivers licensed under the former GLS (pre cohort) and a cohort of young drivers licensed under the enhanced GLS (post cohort) were undertaken⁹. The surveys occurred approximately yearly from 2008 to 2012.</p>
	Did the enhanced GLS P1 peer passenger restriction reduce the rate of crash involvements with two or more peer passengers for first year P1 drivers?	Crash involvement trends: peer passengers before after comparison	<p>Statistical analyses were performed using PRM (described above under the topic area Crashes (overall)) for each peer passenger occupancy category (0, 1, 2+ with supervisor, 2+ without supervisor) taking into account the effects of gender, region and age at licence.</p> <p>Analyses included a comparison group of fully licensed drivers (experienced, aged</p>

⁸ Learner permit holders over the age of 70 years and those who had held a permit for more than four years were excluded from the surveys.

⁹ All probationary drivers in the survey sample were licensed between the ages of 18 and 70 years (this age criterion was adopted to capture a wide range of drivers and to accurately reflect the population; the mean age for the cross-section survey was 22.8 and for the cohort 20.8 years).

Topic area	Evaluation question(s)	Evaluation component(s)	Methods
			30 to 38 years, with first licence issued at age 18 to 20 years)
Drink-driving	<p>Did self-reported drink-driving decrease in the fourth year (of the probationary licence) due to the enhanced GLS compared with before the GLS with fully licensed drivers (in their fourth year of driving)?</p> <p>Did self-reported drink-driving decrease as a result of the enhanced GLS for drivers in their first three years of driving?</p> <p>Did drink-driving offences decrease as a result of the enhanced GLS?</p> <p>Did the enhanced GLS reduce alcohol-related crash involvement rates among fourth year drivers who were licensed at 18 to 20 years?</p>	<p>Probationary Driver Surveys</p> <p>Trends in rates of offending</p> <p>Crash involvement trends: alcohol involvement before after comparison</p>	<p>A series of surveys (internet with follow-up using telephone) of probationary drivers under the old and enhanced GLS regarding learner and probationary driver experience, crashes, exposure and driving behaviours (described earlier).</p> <p>See topic area Offences (overall) above. Most alcohol offences were included.</p> <p>As blood alcohol data for drivers involved in casualty crashes was insufficient, crash involvements were analysed during 'high alcohol hours' (HAH), those periods of the week when the proportion of crashes involving alcohol is much higher than for other times of the week. Changes in crash rates for the young driver cohort (18 to 20 years at licence) were compared with the corresponding changes for a comparison group (licensed drivers whose first car licence was issued at age 18 to 20 years, within 14 to 18 years after licence issue aged 32 to 38 years). The same crash rates and statistical analyses were used as described under the topic area Crashes (overall).</p>
Speeding	<p>Did the enhanced GLS have an overall reduction effect on self-reported speeding by probationary drivers in the following categories:</p> <ul style="list-style-type: none"> • speeding by less than 10 km/h • speeding by 10–25 km/h • speeding by more than 25 km/h? <p>Did the enhanced GLS have an overall reduction effect on offence rates of young drivers for the majority of speed offences?</p>	<p>Probationary Driver Surveys</p> <p>Offence analysis</p>	<p>A series of surveys (internet with follow-up using telephone) of probationary drivers under the old and enhanced GLS regarding learner and probationary driver experience, crashes, exposure and driving behaviours (described earlier).</p> <p>See topic area Offences (overall) above. Speeding and speed-related offences e.g. exceed speed limit by a prescribed amount, drive at dangerous/excessive speed were included.</p>

Topic area	Evaluation question(s)	Evaluation component(s)	Methods
Traffic Infringement Notice (TIN) offences	Did the enhanced GLS have an overall reduction effect on offence rates of young drivers for TIN offences?	Offence analysis	See topic area Offences (overall) above. There were two overall categories of offences – court versus TIN.
Court offences	Did the enhanced GLS have an overall reduction effect on offence rates of young drivers for court offences?	Offence analysis	See topic area Offences (overall) above. There were two overall categories of offences – court versus TIN.
Other risky driving behaviours	<p>Did the enhanced GLS have an overall reduction effect on self-reported fatigued driving, mobile phone use, probationary driving restrictions¹⁰ and driving without a seatbelt?</p> <p>Did the enhanced GLS have an overall reduction effect on offence rates of young drivers for other offences?</p>	<p>Probationary Driver Surveys</p> <p>Offence analysis</p>	<p>A series of surveys (internet with follow-up using telephone) of probationary drivers under the old and enhanced GLS regarding learner and probationary driver experience, crashes, exposure and driving behaviours (described earlier).</p> <p>See topic area Offences (overall) above. Other offences mainly included disobey traffic control signal, drive without P-plates, use handheld mobile phone while driving, drive without seatbelt fastened and drive while banned.</p>

¹⁰ These behaviours include carriage of the probationary licence while driving, display of P plates on the car, not driving a high-powered vehicle and driving an automatic car only if a condition of licensing.

Table 2: GLS evaluation components – order of evaluation components and years of data analysed in each component

Order of evaluation component analyses	Evaluation component	Pre-GLS										GLS introduction		Post-GLS					
		1991-1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
1	Learner Monitor Surveys		1999	2000				2004	2005		2007	2008	2009	2010				2014	
2	Probationary Driver Surveys											2008	2009	2010	2010	2011	2012		
3	Trends in Rates of Offending							2004/05	2005/06	2006/07	2007/2008		2009/10	2010/11	2011/12	2012/13			
4	Learner Permit & Licensing Trends	1991/92-1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14		
5	Crash Involvement Trends:																		
5a	Age at crash involvement time series: crash reductions				2001/02	2002/03	2003/04								2011/12	2012/13	2013/14		
5b	Crash trends over time				2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14		
5c	Age at crash involvement: before and after comparison							2004/05	2005/06	2006/07					2011/12	2012/13	2013/14		
5d	Time since first licence issue (experience): before and after comparison							2004/05	2005/06	2006/07					2011/12	2012/13	2013/14		
5e	Alcohol involvement: before and after comparison							2004/05	2005/06						2012/13	2013/14			
5f	Peer passengers: before and after comparison							2004/05	2005/06	2006/07				2010/11	2011/12	2012/13	2013/14		
5g	Learner permit holders: time series				2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14		

The learner permit and licensing trends analyses indicated it was best to exclude these years from the analysis where possible due to volatility in these trends during this time period

LEARNER DRIVER BEHAVIOUR

Introduction and method

Since 1999, the Learner Monitor telephone survey has measured the supervised driving and driving lesson experiences with professional driving instructors of a representative sample of Victorian learner permit holders. Surveys have taken place in 1999, 2000, 2004, 2005, 2007, 2008, 2009, 2010 and 2014.

Each of these cross-sectional surveys included:

- approximately 1300 learner drivers, to collect information about three stages of learning to drive
- approximately 200 drivers who had recently obtained their probationary licence, to obtain information about their preparation in the three to four weeks leading up to the Drive Test (the final stage of learning to drive)¹¹.

Sample weights were introduced in order to ensure that for each survey year the results were representative of the learner population in terms of age at permit acquisition, gender and region of Victoria. Learner permit holders over the age of 70 years and those who had held a permit for more than four years were excluded from the surveys.

Information was collected using two similar questionnaires (one for learner drivers and one for newly licensed drivers). Each wave of the survey has been conducted using computer-assisted telephone interviewing and conducted by independent market research companies. Total hours of supervised driving experience (including professional instruction) over the whole learner permit period were estimated from the information provided by survey respondents (Meyer et al. 2015a).

In addition to the yearly survey results, in 2014 an analysis was undertaken to determine if changes in practice hours across surveys conducted since 1999 had been statistically significant. Statistical methods were used to determine if learner driver preparation over the last 15 years (nine surveys) had seen progress in achieving the minimum target of 120 hours

¹¹ The stages of learning to drive (of the learner permit period) for this study were defined as:

- Stage 1: 1 to 91 days from acquisition of a learner permit
- Stage 2: 92 to 212 days from acquisition of a learner permit
- Stage 3: 213 to 1461 days (four years) after obtaining a learner permit (or a probationary licence, whichever occurs first). The survey uses learner drivers to gather data on the first three stages of learning to drive.
- Final Stage: the phase of preparation in the three to four weeks (approximately) leading up to the Drive Test. The survey uses newly licensed drivers to gather data on this stage.

of practice over the entire permit period. The reader is referred to Meyer et al. (2015b) for more information about the statistical methods used.

Total hours of driving experience (supervised practice plus lessons)

All learners

The 2014 Learner Monitor survey indicated that the total amount of supervised driving experience on a learner permit was estimated to be 119 hours, averaged across all learners in that year. This is in contrast to the estimated average of 83 hours in 1999 (Meyer et al. 2014).

When considering all learners, there was a steady increase in practice hours across the learner permit period since 1999 (83 hours), with a slight decrease in 2008 after the GLS was introduced. There was on average a statistically significant increase of 2.5 hours per annum in estimated total hours of driving during the entire permit period. Importantly, the 2014 average was only just below the minimum target of 120 hours mandated in 2007 (Figure 3).

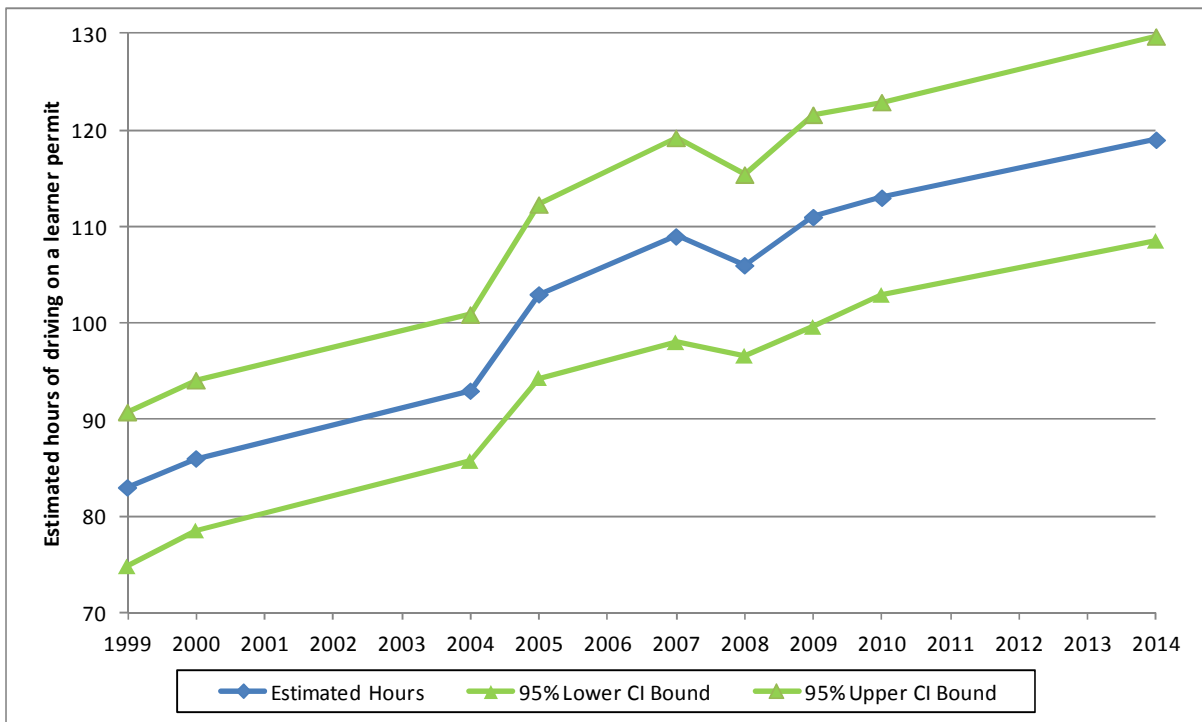


Figure 3: Estimated total practice hours (all learners) with 95% confidence intervals (CI)

Compared with 1999, a statistically significant improvement occurred over each survey from 2005 to 2014. However, in comparison with 2005, there were no statistically significant improvements over the following survey years although significance was nearly achieved for

2014. However, a continuing upward trend, with the exception of a small dip in 2008, is evident.

To conclude, there has been a clear upward trend in learner hours both before and after the introduction of the GLS. The public promotion of the 120 hour message through programs such as the TAC mass media campaigns, practice log books provided to each new learner and the provision of educational programs and materials since the early 1990s by road safety agencies, together with the introduction of the GLS, have most likely been responsible for the sustained upward trend in learner practice hours.

Gender and location comparisons

In 2014, females significantly exceeded the 120 hour target, with an estimated mean practice time of 152 hours in Metropolitan Melbourne and 126 hours in Rural Victoria. For females living in Metropolitan Melbourne and in Rural Victoria, the average increase per year was 3.8 hours for both groups, starting from a base permit practice time of 86 hours and 78 hours respectively in 1999. These trends were statistically significant in both cases (Figure 4).

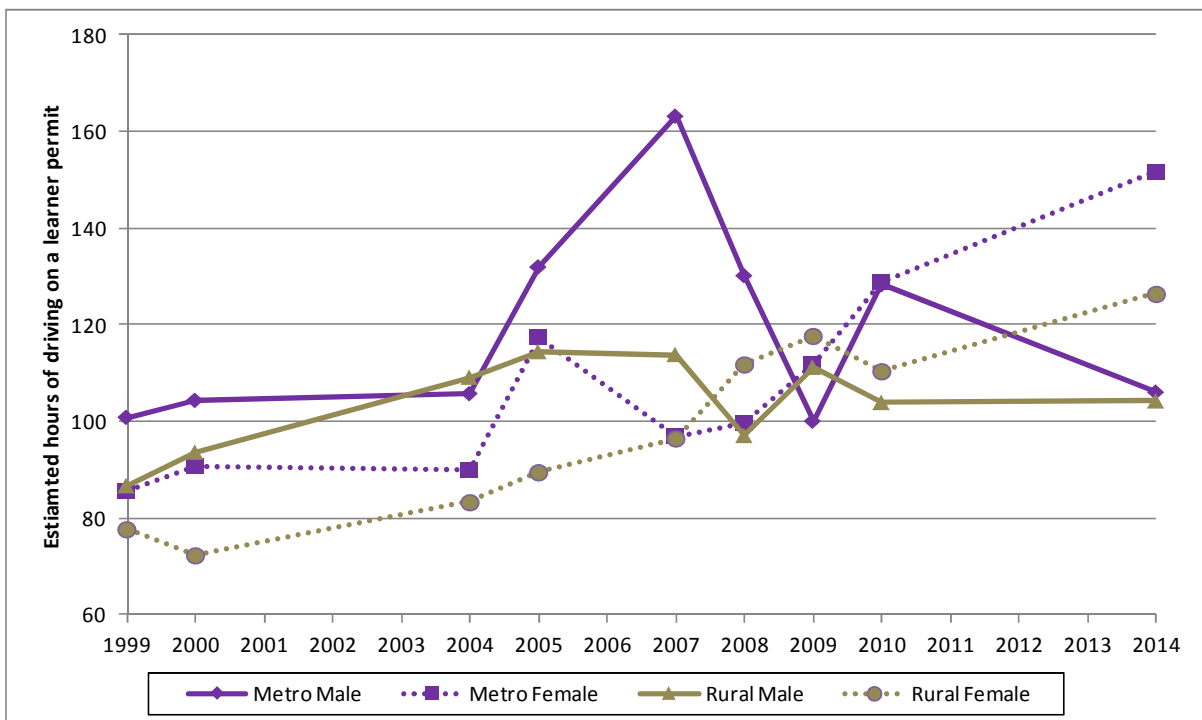


Figure 4: Estimated total practice hours by gender and region

However, for males the trends in total practice hours over time are less evident. High volatility in results, possibly linked to the impact of outliers¹², may help explain the very high estimates for males in Metropolitan Melbourne, especially in the 2007 survey. Males in Metropolitan Melbourne consistently achieved greater than 100 hours of practice from as early as 2000. Males in Rural Victoria, on the other hand, started from a base of between 80 and 90 hours of practice in the early 2000s with practice hours increasing to over 100 hours by 2004. From 2004 onwards, practice hours achieved were in excess of 100 hours with the only exception being 2008. By 2014, while practice hours for males averaged about 100 hours, they were 20 or more hours fewer on average than for females.

Average increases in hours across the surveys by age at learner permit acquisition

For all learner drivers who acquired a learner permit at the age of 17 years, the total number of practice hours increased on average by a statistically significant 5.3 hours per annum, starting from a base permit practice time of 46 hours in 1999 (Figure 5). By 2014, the practice amount for this group had risen to 127 hours. For those who acquired a permit at the age of 18 years or older, hours of practice increased from below 60 in the early 2000s to 88 hours in 2014, at the same time as average learner permit duration increased by 40%. For those who first acquired a learner permit at age 16 years, there has only been a modest 14% increase in the average permit duration between 1999 and 2014. Importantly, however, this 16 years age group had achieved 120 hours or greater since 2000 and in 2014, achieved significantly more (137 hours) than the 120 hour target.

¹² Outliers are values that are much higher (or lower) than the majority of observed values. In these surveys there have occasionally been young males who have reported driving four to eight hours per day for the whole survey week. As the typical number of hours of practice per day is much lower than this, and the choice of sample size was based on the assumption that the values would centre around the typical level, these extreme values caused large increases in the mean. This results in the mean for this group of young males being more variable than for the mean of other groups.

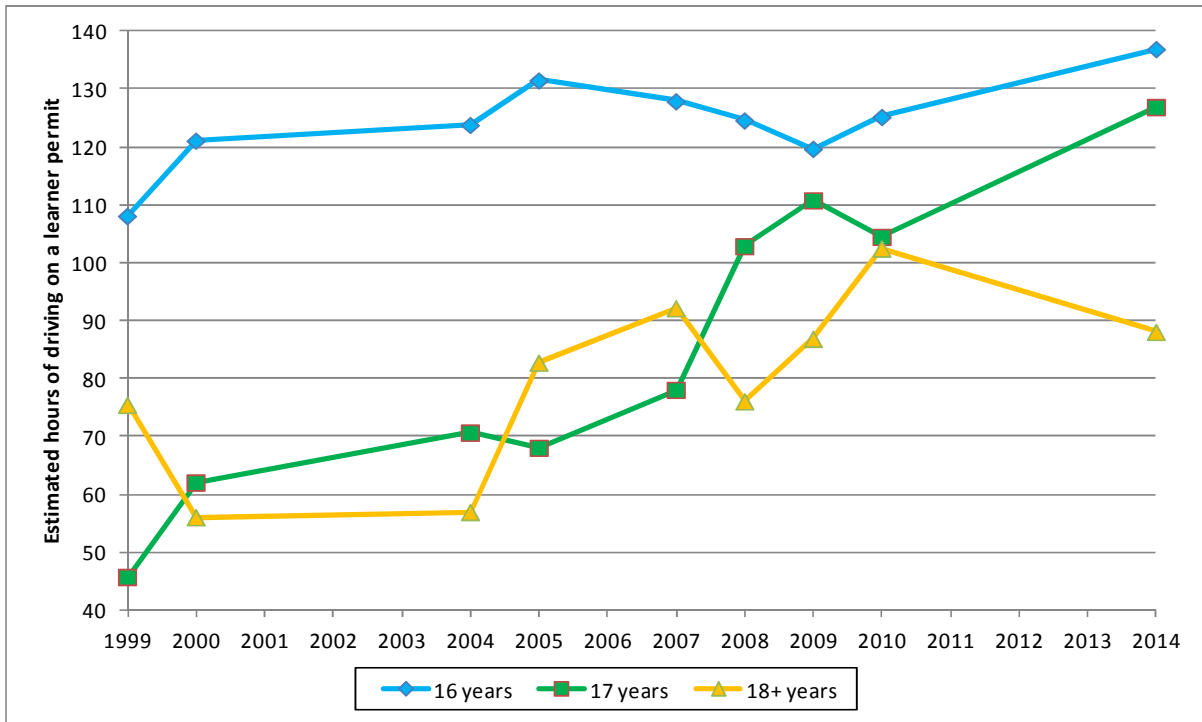


Figure 5: Estimated total practice hours by age when the learner permit was issued

Duration of the learner period

The average duration of holding a learner permit has increased over the survey period for those drivers who were under the age of 20 years when they attained their learner permit. The greatest increase was evident in the 17 year old group, who averaged 62 weeks in 1999 and 112 weeks in 2014. For drivers who acquired their learner permit over the age of 20 years, there has been much less change over time since the first survey was conducted. This is likely to be a reflection of different learner permit period requirements depending on the learner driver’s age. For those aged less than 21 years at the time of licensing, they must hold the permit for 12 months (previously six months before GLS introduction). This requirement was introduced on 1 July 2007 and appears to be making a difference. Those who are older are only required to hold the permit for six months (Table 3 and Figure 6).

Table 3: Estimated mean number of weeks spent holding a learner permit by age at acquisition by survey year

Age at permit acquisition	1999	2000	2004	2005	2007	2008	2009	2010	2014
16 years	101.5	101.0	101.7	102.8	104.7	104.2	104.4	109.3	115.6
17 years	62.0	58.2	66.3	67.8	71.6	88.7	91.4	98.6	112.0
18–20 years	69.5	69.9	69.9	72.9	77.8	95.2	101.5	105.8	112.4
21–24 years	67.3	74.2	67.7	69.2	74.8	79.7	79.9	80.8	79.5
25 years or more	52.4	64.4	57.7	58.1	59.4	63.7	66.9	68.5	68.4
All	82.7	84.0	86.3	87.9	91.1	96.3	98.2	101.7	107.8

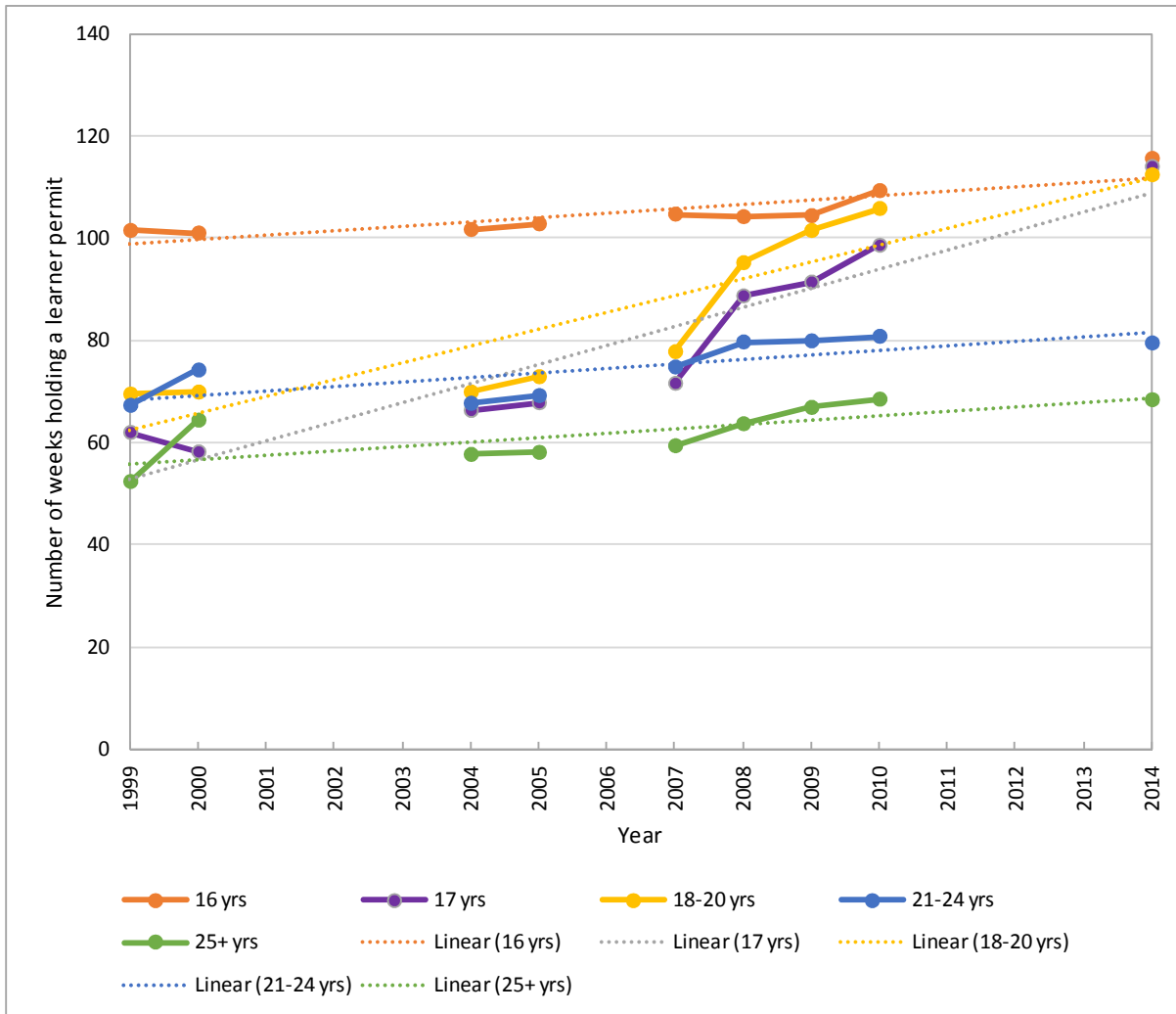


Figure 6: Average duration of the learner permit in weeks by age at learner permit acquisition and year of survey

Note: Linear refers to trend line

Summary

The Learner Monitor surveys found:

- In 2014, the last survey conducted, all learners combined reported an estimated average of 119 hours of supervised driving while holding a learner permit compared with 83 hours in 1999.
- When considering the average for all learner permit holders, practice hours generally increased in an approximately linear fashion from 1999 to 2014, with a slight dip due to the GLS introduction in 2008.
- Compared with 1999, a statistically significant improvement occurred over each survey from 2005 to 2014. However, in comparison with 2005, there were no statistically significant improvements over the following survey years although significance was

nearly achieved for 2014. However, a continuing upward trend, with the exception of a small dip in 2008, is evident.

- There was on average a statistically significant increase of 2.5 hours per annum in estimated total hours of driving during the entire permit period, across the surveys.
- In 2014 females significantly exceeded the 120 hour target, with an estimated mean practice time of 152 hours in Metropolitan Melbourne and 126 hours in Rural Victoria. The increase in these hours by year for both groups was statistically significant.
- Males did less well than females with results year on year being volatile. Metropolitan males achieved 106 hours in 2014 after starting at 101 hours in 1999. Rural males improved less than metropolitan males, only achieving an estimated average of 104 hours in 2014.
- Seventeen year olds (at learner permit acquisition) increased their practice substantially over the surveys. In 1999 they achieved 46 hours and in 2014 they achieved 127 hours. The increase in hours between surveys was statistically significant.
- Sixteen year olds (at learner permit acquisition) started at 108 hours in 1999, attained the 120 hour target in 2000 and achieved more than the minimum target of 120 hours driving practice in 2014 (137 hours) (significant changes).
- Those aged eighteen years and above (at learner permit acquisition) did not show significant improvement in practice hours across the surveys and did not achieve the minimum 120 hours of practice target (88 hours in 2014).
- The average duration of holding a learner permit has increased over the survey period for those drivers who were under the age of 21 years when they attained their learner permit.
- The greatest increase in holding a learner permit was evident in the 17 year old group, who averaged 62 weeks in 1999 and 112 weeks in 2014.

Discussion

The findings from the statistical comparisons across the Learner Monitor survey years show that the GLS requirements of a minimum 120 hours of supervised practice with a 12 month minimum learner permit for those licensed under age 21 years were successfully met by two key groups. Those who were 16 years at learner permit acquisition exceeded the 120 hour expectation with an average of 137 hours in 2014. These learners, on average had achieved the minimum target in the year 2000. A major contributor to this effect was the significant effort in promotion of practice by the road safety agencies. This included the additional provision of targeted learner programs and materials. Those aged 17 years at learner permit acquisition also achieved practice hours that exceeded the target in 2014 (127 hours) and

nearly doubled the time they spent holding a learner permit from 1999 to 2014. This is very encouraging, considering that 69% of those who took out a learner permit in the age range 16 to 24 years had done so at age 16 or 17 years.

It is hypothesised that the learners aged 16 and 17 years wished to obtain their licence at the earliest possible age, 18 years, with many dedicated to achieving the target. Those aged 17 years at learner permit acquisition, who increased their hours of practice significantly over the study period, also appear to have the goal of taking out a licence early. It is highly likely that these positive practice increases are the result of the public promotion of the 120 hours by key road safety agencies in the years leading up to the GLS as well as the impact of the GLS itself. Overall, significant gains were made in getting young learners to meet the practice target and be better prepared for solo driving.

Importantly, those aged 16 and 17 years at learner permit acquisition, transition to become the majority of new licence holders and so benefit from the higher order skills development that accompanies extended supervised practice as a learner.

Learners who acquired their permits at age 18 years or more were significantly below the 120 hour target in 2014 with an average time of 88 hours. The average for this group had improved very little since 1999, suggesting that the GLS changes had little if any impact on this subgroup of learner drivers. A key reason may well be the intention of many to obtain a licence at age 21 years or later and therefore not be subject to the 120 hour requirement and P1 licence stage of the GLS. Apart from this reason, the comparatively low number of practice hours obtained by those aged 18 years or more could occur for life stage reasons (respondents to the 2014 Learner Monitor survey indicated they had been too busy to learn to drive any sooner and/or they had not needed to drive when asked if they expected to delay licensing until age 21 years or older). Regardless of the reasons why learners delay licensing, there are likely road safety benefits occurring from deferred exposure and the protective effect of increased age (greater maturity) at licensing (Senserrick & Williams 2014).

The overall results of the Learner Monitor from 1999 to 2014 are encouraging, with an increase in average practice hours from 83 hours to 119 hours for all learners. Most importantly, those aged 16 and 17 years at learner permit acquisition, the majority of whom will take out a licence at a young age, are surpassing the 120 hour practice target. Overall, the GLS practice and learner permit holding requirements were very successful in increasing levels of practice among learner drivers, and especially so among those intending to take out a licence when aged 18 to 20 years. In addition to the GLS, the public promotion of practice

from the early 1990s by the road safety agencies has assisted in the steady progression of practice hours over time.

PROBATIONARY DRIVER BEHAVIOUR

Introduction and method

VicRoads commissioned a series of surveys to assess the effects of the GLS requirements on self-reported probationary driver behaviour. The survey series was designed to be able to compare novice drivers licensed under the old and enhanced GLS systems. A combination of cross-section surveys (independent samples of drivers, a series of four in total) and longitudinal surveys following a cohort of young drivers licensed under the former GLS (pre cohort) and a cohort of young drivers licensed under the enhanced GLS (post cohort) were undertaken.

VicRoads sampled probationary drivers to be representative of all probationary drivers in the VicRoads Driver Licensing System in terms of gender, licence status and place of residence. All probationary drivers in the survey sample were licensed between the ages of 18 and 70 years (this age criterion was adopted to capture a wide range of drivers and to accurately reflect the population; the mean age for the cross-section survey was 22.8 and for the cohort 20.8 years). Samples of drivers were invited to participate in an online survey via an invitation letter, followed by a reminder letter two weeks after the invitation letter was sent. A reminder email was also sent out (for those in the cohort study for whom an email address was recorded) a week and half after the invitation letter was sent. Those who did not respond to the online survey were followed up by telephone using Computer Assisted Telephone Interviewing (CATI). The telephone follow up was for a period of two weeks. A small incentive was offered (a \$10 gift card initially, which increased for the cohort surveys to a \$30 gift card). There was also a prize draw of a \$500 gift card for each survey conducted.

The cross-section and cohort studies collected data over a series of eight survey waves (or time points). Table 4 shows for the cohort surveys there were four surveys pre-GLS and four post-GLS with a total of seven time points (there was a shared time point at pre-GLS Survey 4 and post-GLS Survey 1). Table 5 shows the four time points for the cross-section surveys. The first three time points match those in Table 4, the cohort surveys.

The cohort study collected data from a cohort of drivers who were first licensed in a six month period before the commencement of the GLS and a cohort of drivers who were first licensed in a six month period under the enhanced GLS. At their final (fourth) survey, members of each cohort were in their third year of driving.

Table 4: Dates of licensing and data collection for the pre- and post-GLS cohorts

Group	Licence Issue	Survey 1	Survey 2	Survey 3	Survey 4
Pre-GLS	Nov 2007-May 2008	July 2008	February 2009	August 2009	July 2010
Post-GLS	Jan 2010-June 2010	July 2010	February 2011	August 2011	July 2012

There were four waves of data collection for the cross-section study. In each survey wave independent samples of participants were selected. Table 5 indicates the first two surveys collected data mainly from those licensed pre-GLS and that the post-GLS participants accounted for a larger part of the sample in the third and fourth survey waves. Due to the timing of the fourth survey, some of the fourth year participants were licensed pre-GLS and some were licensed post-GLS.

Table 5: The design of the cross-section study, outlining participant groups surveyed at each wave of data collection

Group	Wave 1	Wave 2	Wave 3	Wave 4
Survey date	July 2008	August 2009	July 2010	May 2012
Pre-GLS drivers	1 st , 2 nd , 3 rd years	2 nd , 3 rd , 4 th , 5 th years	3 rd , 4 th , 5 th years	Some 4 th year 5 th year
Post-GLS drivers	None	1 st year	1 st , 2 nd years	1 st to 3 rd year some 4 th year

Overall, large samples of young drivers participated in the surveys. In the cohort study 2500 young drivers were invited for each pre and post-GLS cohort. Table 6 illustrates the participation and retention rates of the cohort study. Responses from participants in the first survey were matched to subsequent surveys using the unique participant number.

Participants from Survey 1 were compared with those who were invited to participate, but did not. Females who participated in the survey were over-represented compared with those who did not (55% versus 46%). There were no considerable differences between those who participated in the survey and those that did not on age, socioeconomic status and place of residence.

Table 6: Participation and retention rates in the cohort study

Cohort	Invited to participate	Participated in survey 1	Retained from survey 1 to 4
Pre-GLS cohort	2500	48%, n=1204	44%, n=528
Post-GLS cohort	2500	44%, n=1109	45%, n=501

Table 7 shows the samples invited to participate and the number who actually participated in each wave of the cross-section survey. Again when the samples were compared with those that did not choose to participate in the survey and females were over-represented (56% versus 48%). There were no considerable differences between those who participated and those that did not on age, socioeconomic status and location. Statistical analyses more often yielded significant results in the cross-section study than in the cohort study. This is due to the larger statistical power associated with the larger sample size in the cross-section study.

Table 7: Participation rates in each wave of the cross-section survey

Survey wave	Invited to participate	Final sample
1 – June 2008	3000	1255 (41.8%)
2 – August 2009	5000	2030 (40.6%)
3 – August 2010	5000	1912 (38.2%)
4 – May 2012	5000	1813 (36.3%)
Total	18,000	7010 (38.9%)

The surveys collected some information from participants concerning their experiences as learner drivers but predominantly focused on their driving behaviour as probationary drivers. The latter included their risky driving behaviour, offences, crash involvements, attitudes to rules and restrictions and alcohol consumption before driving. A final report for each study as well as a combined cohort and cross-section studies report were produced (McIntyre 2015a, 2015b, 2015c). A selection of relevant results from the combined report is reported here.

The results distinguish the cohort from the cross-section findings. Each study group is then broken down into drivers first licensed pre-GLS and post-GLS. Statistical testing was used to determine if results were statistically significant. The analysis included a comparison of findings between drivers living in metropolitan and regional areas of Victoria.

The location analyses used a combined data set of cross-section survey participants and the data from the first survey of the cohort study. This was because survey responses from both

studies were able to be combined as the questions asked in both studies were identical (some questions in the survey instruments used were slightly altered between waves of the cohort survey). Fourth year (plus) drivers in the cross-section study were excluded from most analyses as there were few post-GLS fourth year drivers in the cross-section samples and none in the cohort study.

The Australian Bureau of Statistics (ABS 2011) remoteness measure was applied to the residential location data for each participant and then the remoteness classifications (major cities, inner, regional, outer regional and remote) were divided into those who lived in a major city (metro) compared with those who lived elsewhere (regional). In Victoria, major cities include Melbourne, Geelong, Bendigo and Ballarat. Overall, the survey results demonstrated very few differences between the drivers living in metropolitan and regional locations.

Results

Compliance with the P1 Licence

Peer passenger restriction

Under the enhanced GLS, P1 drivers are not permitted to carry more than one peer (a passenger aged 16 to 21 years). Survey participants were asked to indicate how many trips in the last two days involved carriage of one or more peer passengers.

The percentage of trips with two or more peer passengers was significantly lower among the post-GLS P1 licence holders than among their pre-GLS counterparts (both surveys). Pre-GLS, about 13% of trips by those aged less than 21 years at licensing were with more than one peer passenger compared with less than 5% of trips by the equivalent drivers post-GLS.

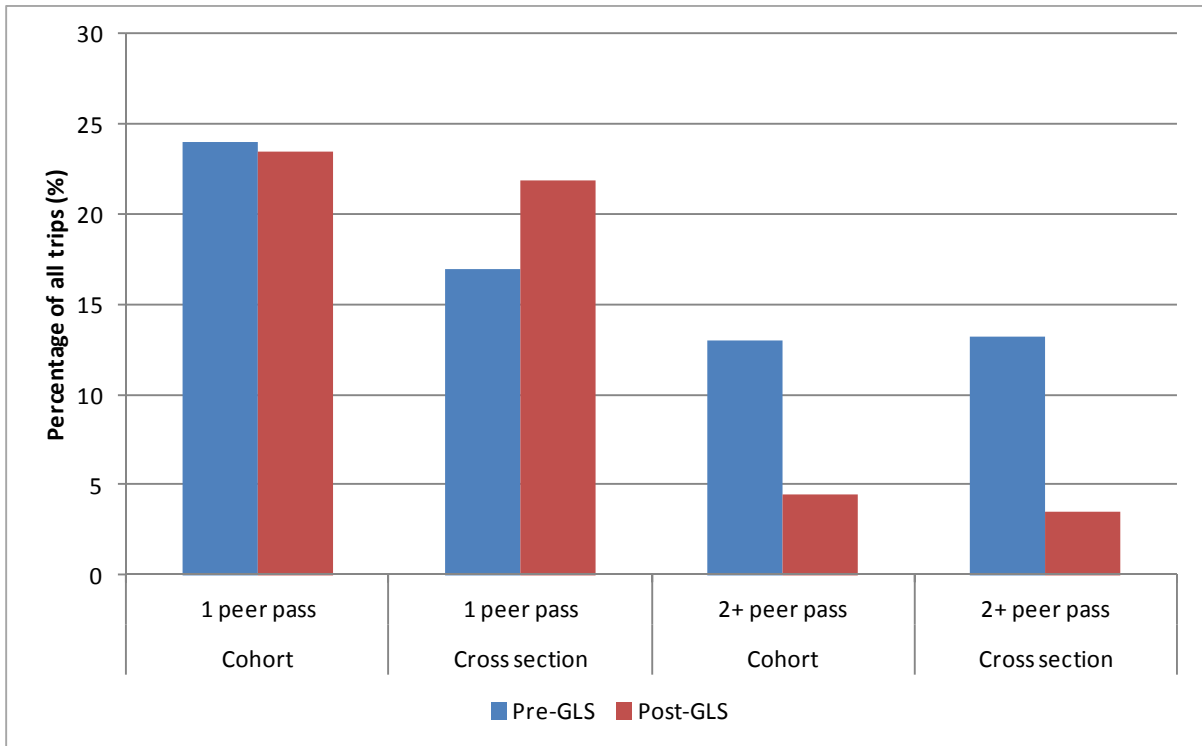


Figure 7: The percentage of trips in the last two days, during which first year drivers aged under 21 at licensing had carried one or more than one passenger aged 16 to 21

By contrast there was no significant change in the percentage of trips undertaken with one peer passenger, either in the cohort or the cross-section study. Figure 7 shows there has been a reduction in young drivers' exposure to risk with fewer trips undertaken with multiple peer passengers.

Hands-free mobile phone restriction

Under the enhanced GLS, P1 drivers are not permitted to use a hands-free mobile phone¹³. In the survey, cohort and cross-section participants were asked in how many of their last ten trips as driver they had used a mobile phone hands-free while driving.

Figure 8 illustrates that the percentage of post-GLS P1 drivers who had used a mobile phone hands-free was significantly lower than the equivalent pre-GLS group for both the cohort and cross-section studies (pre 38.6% versus post 28.5% in the cross-section study, pre 29.0% versus post 18.8% in the cohort study). This is a 36% reduction in mobile phone hands-free use from pre-GLS to post-GLS.

¹³ On 25 November 2013, this restriction was extended to all probationary drivers.

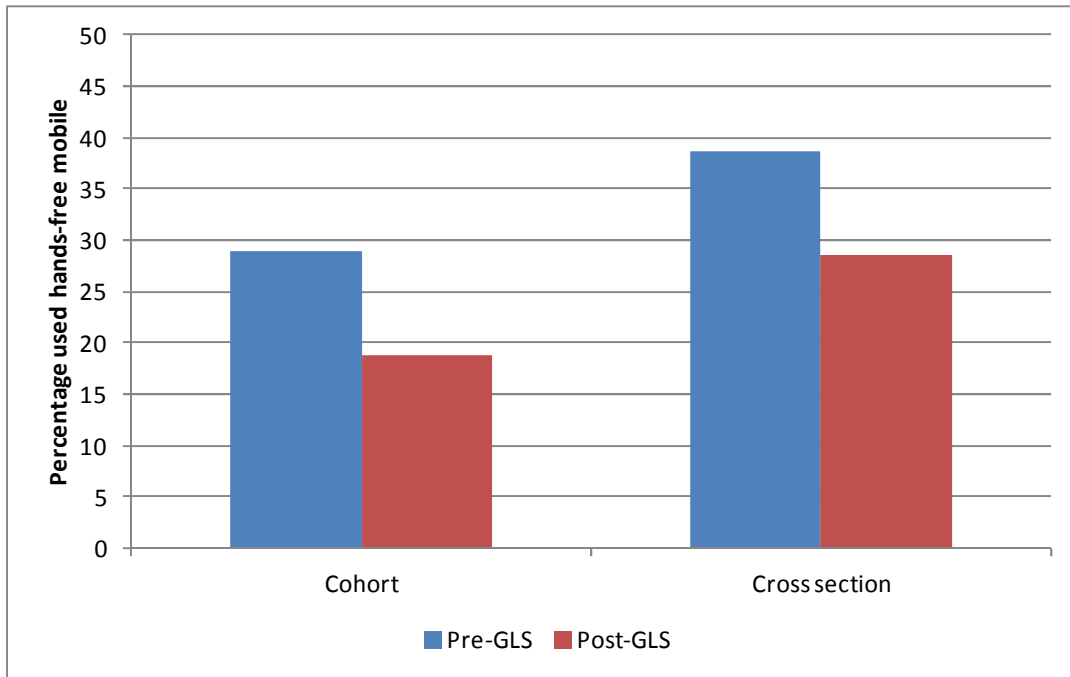


Figure 8: The percentage of first year drivers aged under 21 at licensing who had used, in the last ten trips, a hands-free mobile phone while driving

The above results differed between metropolitan and regional survey participants. Among both the pre and post-GLS groups, hands-free mobile phone use in the last ten trips was more common among the metropolitan young drivers than among those in regional areas (Table 8).

Table 8: The percentage of pre and post-GLS participants who had used a mobile phone hands-free in their last ten trips by location

Pre/post	% Used hands-free Metro	% Used hands-free Regional	Statistically significant
Pre-GLS	38.8	17.9	Yes, $p < .001$
Post-GLS	28.0	16.2	Yes, $p = .001$

There was a significantly lower rate of hands-free mobile phone use post-GLS. This location analysis indicates that the problem was greater among metropolitan young drivers than their regional counterparts. The location analysis also shows that the post-GLS lower level of driving while using the mobile phone hands-free is mostly attributable to the metropolitan participant group.

Risky driving behaviours

Drink-driving

Fourth year of driving

All probationary licence holders, pre and post-GLS, are restricted to a zero blood alcohol concentration (BAC) while driving. The enhanced GLS has increased the duration of the zero BAC period by one year for those who have held a P1 licence (due to the four year probationary period). The following results are from the cross-section study, as the cohort study did not follow drivers to their fourth year.

Participants were asked to report on how many of the last ten trips they had 'driven after drinking when they probably shouldn't have'. The results show the rate of self-reported drink-driving halved post-GLS (Figure 9).

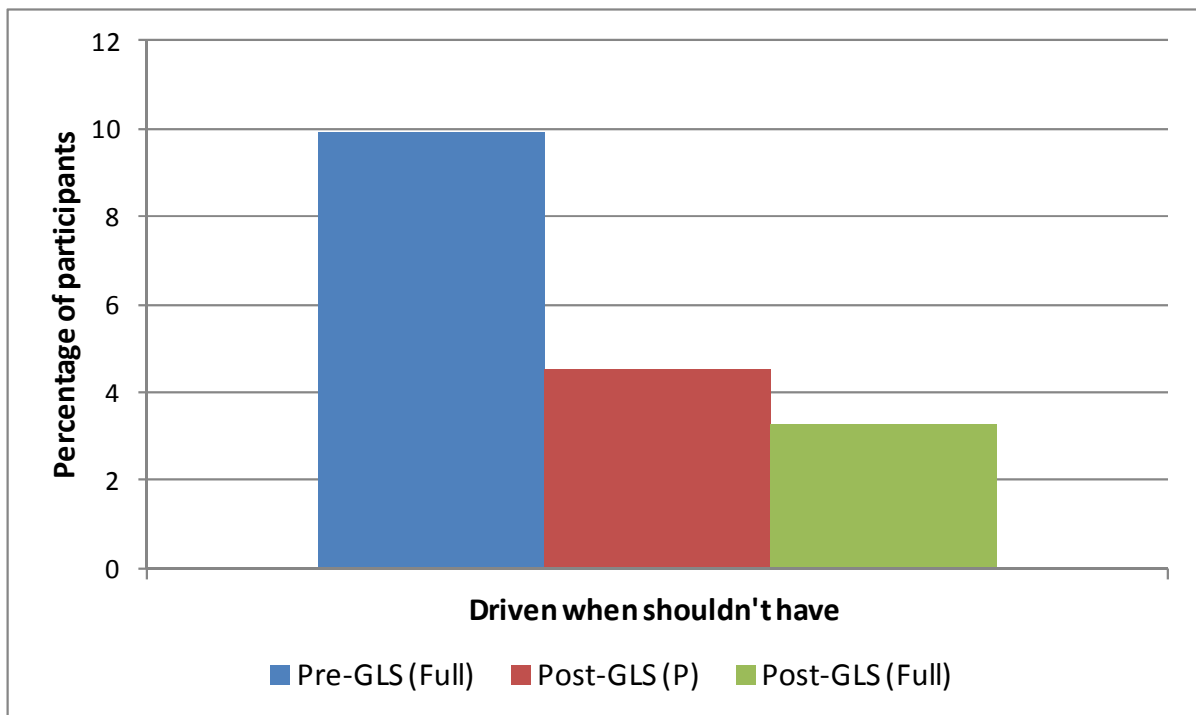


Figure 9: The percentage of 4th year drivers from the cross-section study who had in the last ten trips 'driven after drinking when they probably shouldn't have'

The pre-GLS group was much more likely than the post-GLS groups to report drink-driving in the last ten trips. Note that the number of post-GLS participants who had a full licence was much smaller than the other two sample groups¹⁴. However, the rate of drink-driving reported was significantly lower post-GLS, for fourth year probationary licence holders than for the fourth year fully licensed drivers pre-GLS (9.9% pre versus 4.5% post) (Figure 9). The

¹⁴ For those first licensed under the new GLS on a P2 licence (because they are over 20 years of age at licensing), the minimum probationary period is three years.

extension of the zero BAC into the fourth year appears to have had an effect, even with post-GLS probationary drivers who only undertook the P2 phase of the probationary licence.

There was a significant association between location and self-reported drink-driving among the pre-GLS group, with drink-driving being less common among metropolitan participants (8.1%) than among regional participants (17.7%) (Table 9).

Table 9: The percentage of fourth year drivers who had driven after drinking in the last ten trips, according to location and GLS subgroup

4 th year drivers	% Drink-drive Last 10 trips Metro	% Drink-drive Last 10 trips Regional	Statistically significant
Pre-GLS	8.1	17.7	Yes, p=.001
Post-GLS	4.1	4.9	NA – small cell sizes

The table suggests that post-GLS reported drink-driving events were fewer and similar across the two regions. However, the percentages for the post-GLS fourth year drivers should be viewed with caution as sample sizes were small.

First three years of driving¹⁵

The same question about drink-driving was asked for drivers in their first to third years of driving at the time of the survey. The analysis of the cross-section data showed that pre-GLS participants were significantly more likely than post-GLS participants to have driven after drinking (pre 7.5% versus post 5.3%) (Figure 10). Figure 10 also shows the results from the first, third and final surveys of the cohort study to illustrate behaviour over time (i.e. participants as first year, second year and third year drivers). Despite variability between the pre-GLS and post-GLS across years of experience for the cohort, the comparisons between the pre and post groups revealed no significant results.

¹⁵ Drivers in these analyses would have had various levels of driving experience.

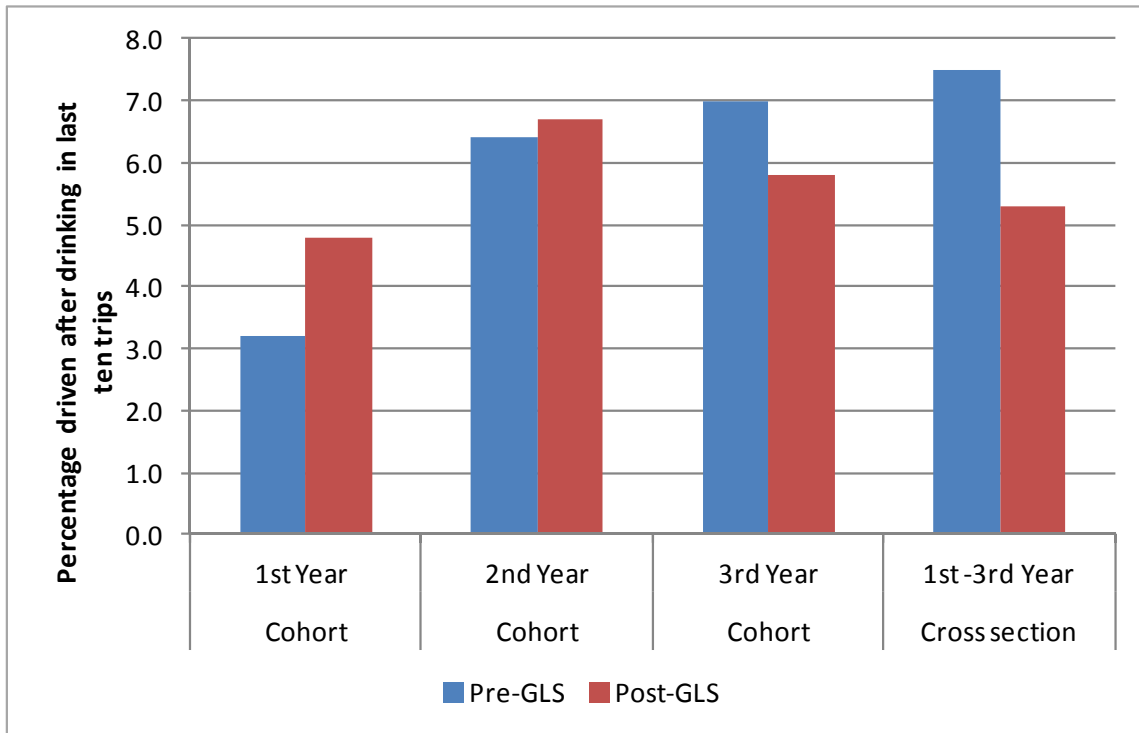


Figure 10: Mean trips in the last ten in which participants had ‘driven after drinking when they probably shouldn’t have’

Risky driving in the last 10 trips¹⁶

Participants were asked on how many of the last ten trips they had engaged in the following risky or illegal driver behaviours:

- speeding by less than 10 km/h
- speeding by 10–25 km/h
- speeding by more than 25 km/h
- driving when very tired
- driving without a seatbelt for part of the trip
- driving without a seatbelt for the whole trip.

There were no statistically significant differences from pre to post-GLS for the cross-section nor cohort studies for any of these risky driving behaviours. Speeding by less than 10 km/h was on average reported in around two trips in the last ten and driving while very tired was reported in about one trip in the last ten.

¹⁶ Drivers in these analyses would have had various levels of driver experience and participants were combined in the cohort study in this regard.

Mobile phone use (hand-held)¹⁷

Participants were asked about their use of hand-held mobile phones while driving, for conversation and text messaging, in the last ten trips. The results indicated (Figure 11):

- There were no significant differences between the pre and post groups for any hand-held mobile phone behaviour in the cross-section study.
- There was a significant difference pre to post for text messaging only in the cohort study. There was more text messaging in the last 10 trips post-GLS (pre 0.74 trips versus post 1.03 trips) (10% of trips).

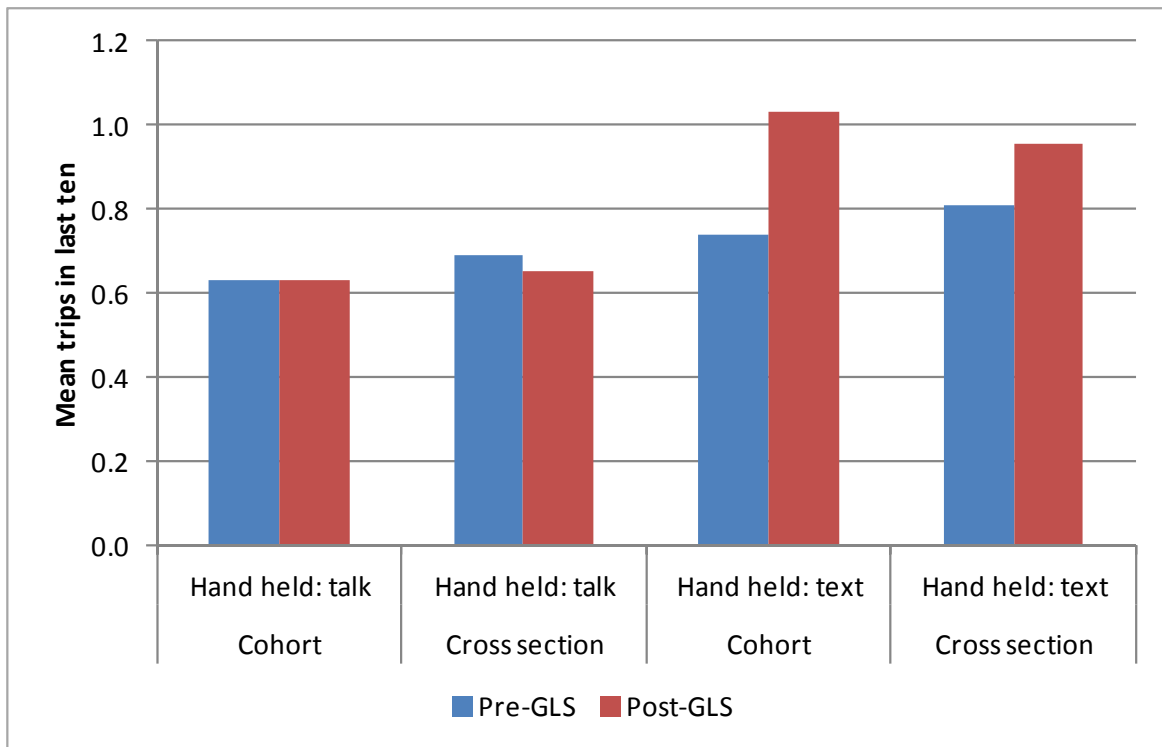


Figure 11: Mean trips in the last ten where hand held mobile phones were used for conversation and text messages

Regional drivers reported using a mobile phone to read or send a text message more than metropolitan drivers, but this difference was not significant.

Probationary requirements¹⁸

Participants were asked about their behaviour in regard to a number of probationary licence regulations. They were asked to indicate how many trips in the last ten they had:

- carried the probationary licence while driving
- displayed P plates on the car

¹⁷ Note that the survey did not ask about hands-free mobile phone use as this behaviour was permitted at that time for P2 drivers. Drivers in this analysis would have had various levels of driver experience.

¹⁸ Drivers in these analyses would have had various levels of driving experience.

- driven a high-powered vehicle they should not have driven
- driven a manual when driving an automatic was a condition of licensing.

Both cohort and cross-section studies revealed that probationary drivers carried the licence and displayed P plates on almost every trip in the last ten both pre and post-GLS. In the cross-section study the post-GLS group had statistically significantly higher mean trips carrying a licence than the pre-GLS group, but the differences were very small and of little practical significance. There were no significant differences in the cohort study.

In both the cohort and cross-section studies, driving a high-powered vehicle and driving a manual vehicle when a condition of the licence was to drive an automatic vehicle were very infrequent. Mean scores were less than 2.5% of the last ten trips. There were no significant differences between the pre and post-GLS groups.

These results show that drivers report that they are very compliant with the probationary restrictions and this has not changed with the enhanced GLS.

Summary

The main findings of the probationary driver GLS surveys were:

- The proportion of trips with more than one peer passenger has decreased from around 13% pre-GLS to less than 5% of trips post-GLS and this was statistically significant. There was no significant change in the percentage of trips undertaken with one peer passenger.
- First-year probationary drivers, who under the enhanced GLS were not permitted to use a hands-free phone significantly improved with around 29% doing so pre-GLS compared with 19% post-GLS (36% reduction).
- Hands-free phone use was significantly more prevalent amongst P1 metropolitan drivers pre- and post-GLS (nearly double the percentage reporting use in their last 10 trips compared with P1 regional drivers).
- Survey participants in the fourth year of their P1/P2 licence halved their self-reported drink-driving post-GLS (5%) compared with drivers in their first year of fully-licensed driving after the three year probationary period pre-GLS (10%).
- Third year drivers also showed reduced drink-driving post-GLS and this was significant (pre 7.5% versus post 5.3%).
- For hand-held mobile phone use, the only result was a significant difference pre- to post-GLS for text messaging. There were more trips with text messaging in the last ten trips post-GLS (pre 0.74 trips versus post 1.03 trips in the last ten).

- There were no statistically significant differences from pre to post-GLS for the cross-section nor cohort studies for risky driving behaviours (speeding, driving fatigued or without a seatbelt).
- Speeding by less than 10 km/h was on average reported in around two trips in the last ten and driving while very tired was reported in about one trip in the last ten.
- Probationary drivers carried their licence and displayed P plates on almost every trip in the last ten both pre and post-GLS. There was very high compliance with these restrictions.
- Driving a high-powered vehicle and driving a manual vehicle when a condition of the licence was to drive an automatic vehicle were very infrequent. Mean scores were less than 2.5% of the last ten trips. There were no significant differences between the pre and post-GLS groups. There was very high compliance with these restrictions.

Discussion

The probationary driver surveys indicated that the GLS had an effect on reducing most self-reported risky driving behaviours. Encouragingly, both the cross-section and the cohort studies showed that the P1 licence holders post-GLS undertook significantly fewer trips with more than one peer passenger than their pre-GLS counterparts.

Similarly, use of a hands-free mobile phone was significantly less common among P1 post-GLS drivers than their pre-GLS counterparts. Despite this, approximately 19% of P1 (post-GLS) drivers in the cohort study and 29% of P1 (post-GLS) drivers in the cross-section study reported using a mobile phone in hands-free mode in their last ten trips, compared with 29% and 39% respectively in the pre-GLS period. In relation to the cohort study, the post-GLS group used a hand-held mobile phone for text messaging significantly more often than did the pre-GLS group, but there were no differences for mobile phone conversation. Clearly there is still room for improvement in reducing all types of mobile phone use.

The rate of drink-driving amongst fourth year drivers halved post-GLS in the cross-section study. Similar results were found for drivers who were in their third year of licensing in the cross-section and cohort, with only the cross-section showing significant results.

Compliance with probationary regulations on the display of P plates, carriage of licence, high-powered vehicle restrictions and driving an automatic as a condition of the licence was very high both pre and post-GLS.

As will be discussed in the Learner Permit and Licensing Trends Chapter, the time immediately before and after the GLS was atypical. As some of the surveys occurred in 2008 and 2009, the survey respondents may have not been entirely representative of probationary

drivers in later years. This may have affected responses to the survey questions. Despite this possibility, the results illustrate positive gains in desired road safety behaviours by probationary drivers after the GLS.

TRENDS IN RATES OF OFFENDING

Introduction

The previous chapter documented the changes in learner permit and licensing rates that have occurred over time, both before, near and following GLS introduction. This chapter explores the changes that have taken place in young driver offending rates arising from the GLS introduction when contrasted with a comparison group. The results are based on an earlier study and report prepared by the Australian Road Research Board (ARRB) (Catchpole 2015).

Potential impact of the GLS on offending

The GLS contains provisions that may directly influence the rate of traffic offending by drivers in their first few years following licensing. The following measures are especially relevant:

- The requirement for a driver licensed at 18 to 20 years to undertake four years, rather than three, of probationary driving and so be subject to the zero blood alcohol law for an extra year.
- A demerit point threshold of five points within any 12 month window during the extended probationary period, as well as the 12 point threshold over any three year window that applies also to full licence holders.
- Any licence suspension (e.g. high-level speeding), court conviction, demerit point suspension or drink or drug-driving offence under Section 49(1) of the *Road Safety Act 1986* during the probationary period results in an extension to that probationary period of six months plus the duration of any suspension. These provisions may provide an additional incentive not to offend throughout the probationary period.
- Several new offence types were introduced in the GLS with a particular focus on the P1 driver. There was a new offence for using a hands-free mobile phone as well as one for carrying more than one peer passenger (aged 16 to 21 years other than a family member). These offences only came into existence with the GLS so no pre-post comparisons are possible. They were designed to limit the inexperienced driver's exposure to a number of potentially risky situations as he or she develops higher order hazard perception skills.

Accordingly, the GLS may be expected to reduce offending rates generally, but especially in relation to offending resulting in licence loss given the extension to the probationary period

that follows. Also, fourth year probationary drivers subject to the zero BAC requirement post GLS may be expected to have a lower rate of drink-drive offending.

Enforcement Trends

Before considering the analysis, it is instructive to examine broad trends in enforcement activity over the period straddling the introduction of the GLS. The focus will be on the key detection methods relating to speeding and overall numbers of roadside alcohol screening tests as speeding and drink-driving are two high-risk behaviours that contribute significantly to road trauma outcomes. The number of offences detected acts as an approximate surrogate for the level of activity devoted to these two risky behaviours.

Table 10 shows the number of speeding infringements committed¹⁹ over the pre-GLS and post-GLS study periods (four years each) arising from the differing types of enforcement. There was an increase in total speed offences of 15% from pre to post-GLS. A reduction in offences arising from the mobile speed camera program by 11% (despite increased hours of operation by 45% pre to post-GLS) has been more than offset by a substantial increase in offences arising from the fixed camera program with the number of speed camera installations increasing by 72%, especially those located at high-risk intersections, from the pre to the post-GLS period.

Table 10: Speed offence counts (detections) by style of enforcement – pre-GLS and post-GLS

Source: Department of Justice and Regulation

Number of offences	Pre-GLS (2004/05 to 2007/08)	Post-GLS (2009/10 to 2012/13)	Percent change
Mobile camera program	2,550,941	2,266,593	-11%
Fixed camera program (includes speed offences at speed/red light camera sites)	1,353,447	2,331,736	72%
Police intervention (side of the road)	652,682	655,100	0%
Total speed offences	4,557,070	5,253,429	15%

Table 11 below shows the cumulative number of roadside alcohol screening tests conducted over a four year period, pre and post-GLS. The number of alcohol screening tests increased by 11% from pre to post GLS.

¹⁹ Infringements issued, not convictions.

Table 11: Roadside alcohol screening test counts – pre-GLS and post-GLS

Source: Victoria Police

Pre-GLS (2004/05 to 2007/08)	Post-GLS (2009/10 to 2012/13)	Percent change
13,524,872	15,026,089	11%

While for the purpose of analysis, a comparison group has been chosen to account for environmental factors such as economic activity or changed enforcement patterns, it is valuable to appreciate the role changing levels of enforcement may play in influencing trends in offence rates and crash involvement rates over time. Quite apart from the apparent overall increase in speeding and drink-drive offences detected, it is worth noting that fixed speed cameras including those located at high-risk intersections are accounting for a higher proportion of total speed offences in the post-GLS period compared with the pre-GLS period. As a cautionary note, should the relative rates of offending by mode of speed enforcement differ between beginning drivers and their more experienced counterparts, the comparison group, no matter how carefully chosen, would not be able to account for such differential effects over time.

It is also possible that with an increased overall level of enforcement, the more experienced driver more readily perceives that change than the novice driver in the short to medium term.

Method of analysis

Data source

Licensing and offence data were sourced from the VicRoads DLS. Information concerning each offence included the driver licence number, date of offence, offence code (identifying the type of offending behaviour), and whether the offence was prosecuted in court or via a Traffic Infringement Notice (TIN). A TIN may be the result of camera detection or a police officer apprehending the offender by the side of the road or attending the scene of a crash.

Pre and post-GLS periods

The analysis focused on drivers licensed and offences committed during two periods:

Pre-GLS period: 1/7/2004 to 30/6/2008 (four years)

Post-GLS period: 1/7/2009 to 30/6/2013 (four years)

The intermediate period (1/7/2008 to 30/6/2009) was excluded from the analysis on the basis that it was a time of transition and was not typical of pre- or post-GLS conditions. As discussed in the previous chapter, the number of licences taken out by young people during

this period was relatively low with most likely a mix of those who were and were not subject to the new learner permit requirements that came into effect on 1 July 2007.

The end point in the post-GLS period of 30 June 2013 was chosen to accommodate a delay between the time of offence that resulted in a court hearing and the court hearing itself. At the time of generating the data extract for the purposes of this analysis, offence data in the DLS were deemed to be reasonably complete up to June 2013. Choice of this end date then limited the 'after' period to four years and, as a consequence, the same duration was chosen for the pre-GLS period.

Study design

The analysis was designed to allow a comparison of offence rates for probationary drivers licensed in the age range 18 to 20 years and in the age range 21 to 24 years 'after' compared with 'before' GLS introduction. Tabulations are based on driver age or experience (time held licence) at time of offence. For a valid comparison to take place, firstly variations in driving exposure pre- versus post-GLS needed to be accounted for. Secondly, broader trends in offence rates unaffected by the introduction of the enhanced GLS needed to be accommodated through the use of a comparison group.

Exposure was expressed as 'offences per 100 driver-years' and was used to standardise offence numbers by the total number of driver years during which time those offences were accumulated by all drivers in each of the novice driver (intervention) and comparison groups. The changes in offence rates between the periods 'before' and 'after' the GLS for the two novice groups were then compared with the corresponding changes experienced by the comparison groups. Statistical analyses to determine the significance of changes in offence rate from the pre-GLS period to the post-GLS period involved the calculation of odds ratios that compared changes for the novice groups with changes for the corresponding comparison groups. The odds ratios were converted to Z-scores to assess their statistical significance.

Drivers in the comparison groups were subject to all the same ambient factors over time with the exception of the direct influence of the GLS. It should be noted that given the 'real world' nature of this evaluation, there is always the possibility that latent factors could differentially affect the offence rates of the novice group compared with the comparison group over time. However, every effort was made to match the two groups as far as is reasonably practicable.

Arising from the above consideration, eight driver groups were defined for the purpose of this analysis and are described in Table 12.

Table 12: Driver groups for offence analysis

Driver group	Licence issue age (years)	Licence issue date and analysis period	Learner permit issue date	Experience (completed years since licence issue)	Number of drivers
Pre-GLS Novice Group 1	18–20	1/7/2004 to 30/6/2008	On/after 1/7/2002	0–3	217,629
Post-GLS Novice Group 1	18–20	1/7/2009 to 30/6/2013	On/after 1/7/2007	0–3	188,494
Pre-GLS Comparison Group 1	18–20	1/7/1994 to 30/6/1998	Any	10–13	205,100
Post-GLS Comparison Group 1	18–20	1/7/1999 to 30/6/2003	Any	10–13	207,250
Pre-GLS Novice Group 2	21–24	1/7/2004 to 30/6/2008	Any	0–2	24,450
Post-GLS Novice Group 2	21–24	1/7/2009 to 30/6/2013	Any	0–2	34,507
Pre-GLS Comparison Group 2	21–24	1/7/1994 to 30/6/1998	Any	10–12	22,762
Post-GLS Comparison Group 2	21–24	1/7/1999 to 30/6/2003	Any	10–12	20,682

Drivers were eligible for the Post-GLS Novice Group 1 only if they obtained their learner permit after 1 July 2007 and so were subject to all the provisions of the GLS, including the need to hold their permit for a minimum period of 12 months and to accumulate a minimum 120 hours of supervised driving practice. The four year after period means that those drivers who took out their licence in 2009/10 were in their fourth year of probationary driving for at least some part of 2013/14. For drivers in Novice Group 2, the analysis was confined to their first three years post licence to correspond to the three year P2 period. Note that those drivers who incurred a suspension during their probationary periods would have their overall time as probationary drivers extended to beyond four years for P1 drivers and beyond three years for P2 drivers. The analysis, however, is confined to periods as measured by ‘time since first licence’, and would therefore include some drivers during their period of suspension.

The comparison groups had similar structures to the novice groups, but these driver groups had been issued a licence ten years previously and so would have been granted full licences in advance of the pre-GLS and post-GLS periods. The pre- and post-GLS novice and comparison groups were defined so as to be mutually exclusive - a driver who belonged to one of the eight groups could not belong to any other group. Drivers who had previously held a learner permit or licence in another jurisdiction were excluded from all groups.

It is worth noting the offence rates analysis was conducted at an earlier point than the crash rates analysis and as a result there is not an exact match between the two analyses regarding study design.

Further information regarding those drivers who were excluded from the eight groups and the reasons for their exclusion can be found in the ARRB report (Catchpole 2015, pages 5–6, 12–14).

Selection of offences

Eligible offences included those committed by drivers belonging to one of the eight groups and within the pre- and post-GLS time periods defined earlier. Offence types included in the study comprised:

- alcohol-related offences
- speeding and speed-related offences e.g. exceed speed limit by a prescribed amount, drive at dangerous/excessive speed
- mobile phone offences
- unauthorised driving (e.g. while banned or while licence expired)
- failure to wear a seatbelt
- disobeying a traffic light
- disobeying a traffic sign
- failure to give way or stop
- following too closely
- careless driving
- dangerous driving
- failure to display P plates
- probationary driver failing to carry the licence while driving
- probationary driver driving a high-powered vehicle
- violations of the peer passenger restriction for P1 drivers.

Further details regarding each of these offences are in Appendix B – Descriptions of selected offences and those that were excluded can be found in Catchpole (2015).

Given the choice of sampling periods and driver groups, information on offences can be gathered over more years for first year drivers than for second year drivers, more years for second year drivers than for third year drivers and so on. For this reason, the analysis is confined to comparisons between novice and comparison groups within single years of driver age or experience. It has therefore been necessary to combine offences into broader categories to build the sample sizes for analysis. Larger sample sizes increase the likelihood

that significant changes in offence rates arising from the enhanced GLS will be detected. As a result, three broad offence groupings are the subject of analysis within this chapter:

- exceed BAC limit offences (one category)
- court or TIN offences (two categories)
- speed-related, alcohol-related or 'other' offences (three categories).

A description of the offences that fall within each of the summary offence groups above can be found in Appendix B – Descriptions of selected offences.

Statistical testing

Test used

In order to determine if there were differences between the novice and comparison groups, the rate of offending was calculated for each group. This is the ratio of offences committed within the defined period divided by the cumulative exposure for the driver group of interest and expressed as offences per 100 driver-years. The ratio of the pre to post-GLS offences rates for each group is then calculated and compared, and statistical testing is then applied. For further details, refer to Catchpole (2015), page 9.

Significance levels, sample size and statistical power

Choice of significance levels depends on the number of statistical tests to be performed. The larger the number of statistical tests to be performed, the higher the likelihood that a positive outcome could result through chance variation alone. Accordingly, as analyses were performed at increasingly greater levels of data disaggregation, the p-value used for testing reduced from 0.05 to 0.0005 at the highest level of disaggregation.

The decision was taken that the analysis should be capable of detecting a change in offence rate due to the GLS as small as 10% with a statistical power of 80%. In other words, there should be at least an 80% chance of a test yielding a significant result, if the true impact of the GLS on offence rates is 10%. Further information regarding the above issues, including sample size requirements can be found in Catchpole (2015), pages 10–11.

Results

Results presented in tables describe for each relevant group or subgroup in either the pre-GLS or the post-GLS period, the number of offences, the related exposure in driver-days and the calculated offence rate per 100 driver-years. Where relevant, the results of the applicable statistical tests are also provided. To assist the reader to identify statistically significant changes, probability values that are less than the relevant threshold are shaded **green**. If the probability was greater than the threshold for significance and the sample size

(total number of offences) was less than required, the probability values are shaded grey to indicate that the test was inconclusive due to the small sample size.

Offences newly-created for the GLS

The offences of violating peer passenger restrictions and the use of hands-free mobile phones were introduced for first-year licence holders as part of the implementation of the GLS. Table 13 shows the rates for each of these offence types for P1 licence holders belonging to the post-GLS Novice Group 1 (aged 18 to 20 at licence issue).

Table 13: Rates of peer passenger and hands-free mobile phone offences (restricted to first-year licence holders in the post-GLS Novice Group 1)

	Peer passenger	Mobile phone L or P	Total
Offence count	6,068	1,018	7,086
Exposure (driver-days)	58,955,942	58,955,942	58,955,942
Offence rate per 100 driver-years	3.8	0.6	4.4

While no comparison can be made with their pre-GLS counterparts, the offence rate for carrying more than one peer passenger is some six times that for using a mobile phone, hand-held or hands-free. Results will be dependent on levels of enforcement activity.

Overall comparison of driver groups

The tables to follow compare the offence rates for the relevant novice sub-group before and after GLS introduction with the corresponding offence rates for the comparison group. The relative change in offence rates gives rise to an estimated net change. For example, a net change of -8.2% can be interpreted as a favourable effect of the intervention (the GLS) after allowing for the impact of other factors (such as changes in enforcement activity) on both novice and comparison groups. A net change in the positive direction, on the other hand, reflects an unfavourable result.

Table 14 shows the overall offence counts, exposure and calculated offence rates for both pre and post-GLS Novice Groups 1 and pre and post-GLS Comparison Groups 1 (both aged 18 to 20 years at licence issue). It should be noted that each group is a composite across four years of driver experience, containing proportionally more drivers with less experience than with more experience. Each of the four years in the pre- and post-GLS periods contains drivers in the novice groups with less than one year of experience; but only the last year in each time period contains some drivers who have experience in excess of three years.

Table 14: Offence rates for Novice Group 1 (18–20 years at licence) and Comparison Group 1

	Novice Group 1			Comparison Group 1			Net change	Probability*
	Pre-GLS	Post-GLS	Change	Pre-GLS	Post-GLS	Change		
Offences	198,809	159,485	-19.8%	143,625	135,756	-5.5%	-15.1%	
Exposure (driver-days)	149,313,947	126,211,529	-15.5%	133,880,048	132,137,246	-1.3%	-14.4%	
Rate per 100 driver-years	48.6	46.2	-5.1%	39.2	37.5	-4.2%	-0.9%	0.07

* Probability values less than 0.05 were considered statistically significant.

While the difference in overall offence rates between the composite novice and comparison groups is minimal and does not quite reach statistical significance, the table highlights the significant difference in exposure trends between groups. Exposure for the novice group members dropped by 15.5% from pre- to post-GLS while there was a corresponding drop of only 1.3% for the comparison group.

Table 15 shows the corresponding figures for Novice Group 2 and Comparison Group 2 members, all of whom were licensed at ages 21 to 24.

Table 15: Offence rates for Novice Group 2 (21–24 years at licence) and Comparison Group 2

	Novice Group 2			Comparison Group 2			Net change	* Probability
	Pre-GLS	Post-GLS	Change	Pre-GLS	Post-GLS	Change		
Offences	18,957	25,436	34.2%	14,858	12,887	-13.3%	54.7%	
Exposure (driver-days)	16,522,115	21,156,172	28.0%	15,428,286	13,245,632	-14.1%	49.1%	
Rate per 100 driver-years	41.9	43.9	4.8%	35.2	35.5	1.0%	3.7%	0.0176

* Probability values less than 0.05 were considered statistically significant.

Overall, offence rates increased by 4.8% among Novice Group 2 members and by 1.0% among Comparison Group 2 members, a net unfavourable change of 3.7%, which was found for this group to be statistically significant. The increase though is of relatively low practical significance, given its small size and the comparatively small number of drivers to which it applies: the total number of offences registered by Novice Group 1 post-GLS was six times greater than the number accumulated by Novice Group 2, because by far the majority of drivers in the novice groups were licensed at 18 to 20 years rather than at 21 to 24 years.

There has been an appreciable increase in exposure of 28% among Novice Group 2 members aged 21 to 24 years at licensing in the post-GLS compared with the pre-GLS period. This is a stark contrast to exposure trends among the 18 to 20 year old novice group and also highlighted in the previous chapter addressing driver licensing trends. In comparison to Novice Group 2, exposure among Comparison Group 2 members dropped by 14.1% from the pre-GLS to the post-GLS period.

Summary

A large number of statistical tests were conducted in which offence rates were compared pre- with post-GLS for corresponding subgroups of the novice and comparison groups.

Subgroups for analysis comprised:

Novice Group 1:

- Victorian licence issue age 18–20 years
- drivers in each of their first four years of driving since licence at date of offence
- drivers aged 18/19/20/21/22+ years at date of offence.

Novice Group 2:

- Victorian licence issue age 21–24 years
- drivers in each of their first three years of driving since licence at date of offence
- drivers aged 21/22/23/24/25+ years at date of offence

Offence categories:

- total
- offence class: Traffic Infringement Notice (TIN)/court-related offence
- offence group: speed/alcohol-related/other
- offences for exceeding a specific BAC level (sub-group of alcohol-related).

Given the number of tests that were conducted, a summary of outcomes has been prepared with a view to discerning broader patterns of influence. Table 16 shows the percentage change in offence rates for the novice group net of the corresponding change for the comparison group. Results are colour coded to show whether the change was statistically significant and/or the percentage change was greater than 10%.

Table 16: Summary of offence rate changes for novice groups net of changes for comparison groups (Novice Group 1 - 18 to 20 years at licence issue, Novice Group 2 - 21 to 24 years at licence issue)

Group	Experience or Age	Overall offence rate	Offence exceed BAC limit	Offence class		Offence group		
				Court	TIN	Speed	Alcohol	Other
Experience								
Novice Group 1	0 to < 1 yr	-1.9	-13.1	-16.1	-0.2	4.3	-20.7	-19.9
	1 to < 2 yrs	1.7	-23.3	-9.0	3.3	9.9	-25.3	-17.8
	2 to < 3yrs	-1.3	-1.3	-10.2	0.0	6.5	-4.1	-21.5
	3 to < 4 yrs	-9.3	-	14.9	-11.1	-21.3	-37.5	19.5
Novice Group 2	0 to < 1 yr	8	-26.2	-18.7	10.7	15.7	-26.7	-12.4
	1 to < 2 yrs	1.2	-17.0	-7.9	1.8	5.1	-16.5	-12.7
	2 to < 3yrs	-3.9	-41.9	-35.5	-1.0	3.9	-37.6	-22.3
Age at offence								
Novice Group 1	18 yrs	-3.2	-	-14.2	-1.7	2.9	-12.9	-21.3
	19 yrs	1.6	-	-14.4	3.5	9.8	-27.6	-18.6
	20 yrs	0.9	-	-7.9	2.4	9.1	-12.9	-20.1
	21 yrs	-4.7	-	-3.4	-4.5	-7.1	-32.9	-5.0
	22+ yrs	2.8	-	-5.4	3.7	1.8	-19.3	-2.1
Novice Group 2	21 yrs	12.2	-	-32.6	16.6	26.6	-29.7	-17.8
	22 yrs	5.7	-	-1.9	7.5	9.2	-22.6	-2.6
	23 yrs	7.3	-	-13.7	8.4	14.9	-5.4	-18.4
	24 yrs	-2.0	-	-52.1	2.9	6.5	-37.1	-26.8
	25+ yrs	-6.0	-	14.9	-6.7	-4.5	-35.9	-8.7
Legend		Statistically significant reduction			Statistically significant increase			
		Reduction > 10%, not significant			Increase > 10% but not significant			

Note: Offences exceeding the BAC limit are a subset of a broader range of offences labelled as 'alcohol' in the table

For **drivers in Novice Group 1 (18 to 20 years at licence issue) in their first three years of driving experience** and for the subset of drivers aged 18 to 20 years at offence, the following broad trends can be discerned:

- TIN offence rates remained relatively stable. Increases of 3.3% for drivers with one to less than two years of experience and 3.5% for those aged 19 years at time of offence were statistically significant, although of modest practical significance.
- There were general decreases, many of them statistically significant, in offence rates relating to exceeding the BAC limit (assessed for experience groups only), court offences, alcohol and 'other' types of offences.
- Speed offences did increase, and significantly so for those in their first three years of driving and those aged 19 (9.8%) and 20 (9.1%) at offence, but least for drivers with zero to less than a year of experience (4.3%).

For **drivers in Novice Group 1 (18 to 20 years at licence issue) in their fourth year of driving** (full licence holders in the pre-GLS period but probationary licence holders in the

post-GLS period), trends in offence rates differed to some degree from those drivers with less experience:

- Their overall offence rate dropped significantly by 9.3%, as did the TIN offence rate (11.1%) and the speed offence rate (21.3%). The alcohol offence rate also dropped but not significantly.
- The offence rate for 'other' offences increased significantly by 19.5%, while court offence rates also increased, but not significantly.
- The above trends are generally not reflected in the offence rates of Novice Group 1 members aged 21 or 22+ at time of offence, for whom sample sizes were relatively small. Nonetheless, 21 year olds registered significant decreases in the relative offence rate for speed-related (7.1%) and alcohol-related offences (32.9%).

For **drivers in Novice Group 2 (21 to 24 years at licence issue)** the following trends in offence rates are apparent:

- There were reductions in offence rates for exceeding BAC limits, court offences, alcohol and 'other' offence types, the majority of which were not significant. Relatively small sample sizes reduced the probability of significance.
- Drivers in their first year registered an 8% significant increase in offences overall overlapping with drivers aged between 21 to 23 years at offence who experienced non-significant increases in their overall offence rates ranging between 5.7% and 12.2%.
- Offence rates for TIN offences and speed offences generally increased. The increases were significant (10.7% and 15.7% respectively) for drivers with less than one year of experience. Similar trends were observed for drivers aged 21 years at offence whose offence rates also increased for these two types of offence but significantly so only for speed offences (26.6%).
- The speed offence rate also increased significantly (14.9%) for drivers aged 23 years at offence.
- Finally, 'other' offence types decreased significantly for drivers aged 24 years at offence (26.8%).

Discussion

Overall, the relative offence rates of drivers aged 18 to 20 years at licence changed little in the post-GLS compared with the pre-GLS period after accounting for the trend in the comparison group. The main exception was drivers in their fourth year, the last year of the extended probationary period under the enhanced GLS, for whom the relative offence rate

decreased by a significant 9.3%. Analysis of offence rated by category, however, did lead to some mixed results.

Decreases in offending trends were generally observed across both novice groups (18 to 20 and 21 to 24 years) for court offence rates and those linked to alcohol use and 'other' offences. These trends may potentially reflect the new provision under the GLS whereby any period of licence loss during the probationary period will result in that stage of the probationary licence being extended by six months plus the period of licence loss. However, a specific investigation analysing the effect of this particular GLS component was not undertaken.

Speed offence rates generally increased with the exception of drivers in their last year of the P1/P2 probationary licence. As previously noted, the level of speed offences detected by Victoria Police or through the speed camera program increased by 15% over the period with some variation occurring over time in the types of enforcement giving rise to these offences (in addition, preliminary breath tests increased by 11% from pre to post-GLS). This does not explain why speed offence rates increased to a greater extent for inexperienced drivers than for comparison group members. It is difficult to explain this result as an outcome arising directly from the provisions of the enhanced GLS. One possible explanation is that exposure (as measured by kilometres of travel rather than time holding a licence) may have increased among the novice driver groups over the study period. A second potential explanation is that experienced drivers are more attuned and responsive in the short term to substantial changes in the level of speed enforcement activity than are young, inexperienced drivers. These possible explanations, however, would need to be the subject of further investigation.

The migration of some drivers from being licensed at an earlier to a later age post-GLS could give rise to changing exposure patterns within the 18 to 20 year olds and the 21 to 24 year olds driver age brackets; as an example, those who choose to travel more may get their licence earlier while those who have less reliance on personal transport may decide to postpone licensing, but the study was not able to measure such changes. Significant changes in the composition of the novice groups post- versus pre-GLS may have taken place to the extent that comparisons are no longer 'like with like'.

To this end, it is worth considering the changing offence profile for the 18 to 20 year olds together with the 21 to 24 year olds. The number of drivers affected and the number of offences committed by drivers aged 18 to 20 years at licence are some six times greater than for drivers aged 21 to 24 years at licence in the post-GLS period of the study. As a result, the impact of a substantial change in offence rate for Novice Group 1 is of greater

practical significance than is an equivalent rate change for Novice Group 2. Significant results for both groups, nevertheless, remain important.

A real world evaluation is potentially subject to a number of influences such as those described above. As a result, it is not possible to ascribe a direct 'cause– effect' relationship between introduction of the enhanced GLS and the observed changes in offence rates. Finally, the analysis of traffic offence rates provided mixed results. Nevertheless, it is highly likely that the enhanced GLS has had some influence in reducing the overall rate of serious offending for court related and drink-driving offences.

LEARNER PERMIT AND LICENSING TRENDS

Introduction and method

The Learner Driver Behaviour Chapter documented the changes in the number of practice hours by learner permit holders that have occurred over time, both before and after the introduction of the enhanced GLS. On 1 July 2007, the requirements were introduced to hold a learner permit for a minimum period of 12 months and undertake a minimum 120 hours of on-road supervised driving experience as a learner for those aged under 21 years at time of licensing. Before the introduction of these requirements, there were no minimum practice hours specified and the learner permit needed only be held for a minimum of six months.

This chapter explores the changes that have taken place in learner permit tenure and in licensing trends arising from the GLS introduction. These changes had implications for the crash analysis methods adopted in this GLS evaluation. This chapter covers:

- trends in learner permit issue and tenure
- licensing trends over time
- trends in driver licensing by gender, age at licence issue, region and time permit held
- licensing trends and the practical Drive Test
- licensing age profile pre- and post-GLS for a cohort of 18 year olds.

In order to analyse the above trends, records of drivers aged under 25 years who were issued their first Victorian car learner permit or first Victorian car licence from July 1991 to June 2014 were obtained from the VicRoads Driver Licensing System (DLS). Trends over time in the number of first car learner permits and first car licences issued, broken down by gender, age and region, were analysed by ARRB (Catchpole 2016). Drivers who appeared to have held a previous licence or permit in another jurisdiction (for example, those graduated from a learner permit to a licence in less than the prescribed minimum time) were excluded from the analyses.

Licensing trends over time

The decline in driver licensing rates among young people is a trend common to many developed countries in recent years, for example in Australia, Sweden, Norway, North America and Japan (Delbosc & Currie 2013). When trends by single year of age at licence issue are examined, however, a slightly different picture emerges for Victoria.

Figure 12 shows the licensing rates for Victoria per head of population for young adults by single year of age at licence, from 18 to 24 years, over the financial years 1991/92 to 2013/14.

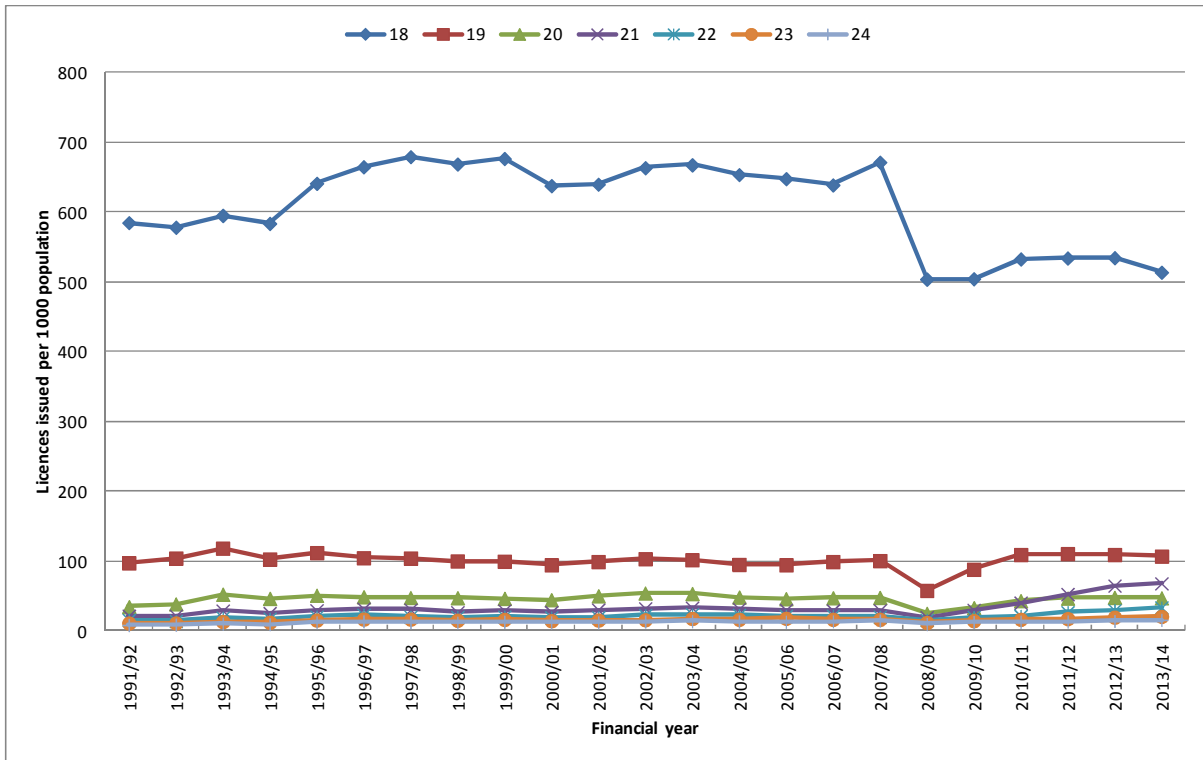


Figure 12: Young adult licensing rates per head of population by single year of age at licence 18 to 24 years (1991/92 to 2013/14)

The figure shows that licensing rates per head of population **by single year of age at licence issue** were relatively steady in the years leading up to the introduction of the GLS. This is especially evident in the graph for those aged 18 years (blue line) or 19 years (red line) at licensing. Figure 13 depicts more clearly the trends for those aged 19 to 24 years at licence by excluding 18 year olds. In the decade leading up to introduction of the GLS the overall changes in licensing rates within each of the licensing ages, 18 to 24 years, were relatively minor.

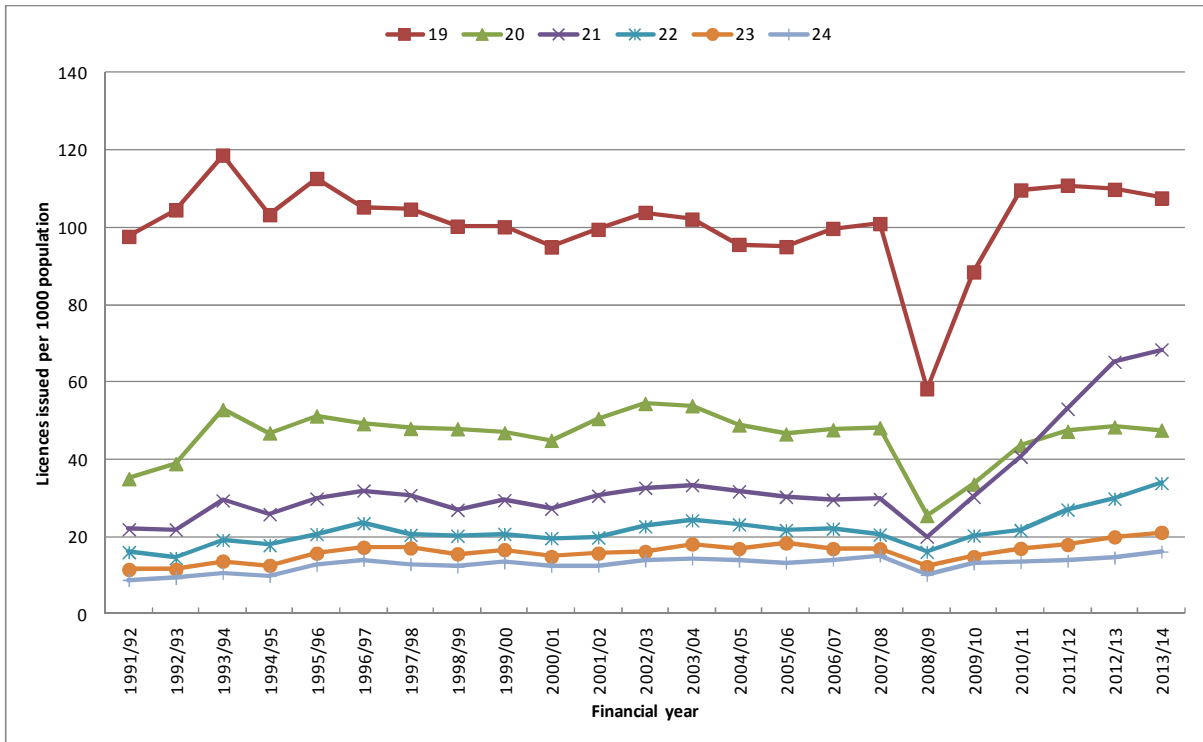


Figure 13: Young adult licensing rates per head of population by single year of age 19 to 24 years (1991/92 to 2013/14) (excludes 18 year olds)

In both Figure 12 and Figure 13, a disruption to licensing trends is evident in the immediate lead up to and in the aftermath of the GLS being introduced across 2007 and 2008. The disparate trends post-GLS among the differing licensing age groups will be the subject of further discussion later in this chapter.

Trends in learner permit tenure

Figure 14 shows the number of first learner permits issued to drivers aged 16 to 24 years for six-month periods (July to December 1991, January to June 1992, etc.) between 1991 and 2014, categorised by elapsed time from first learner permit issue date until first licence issue date.

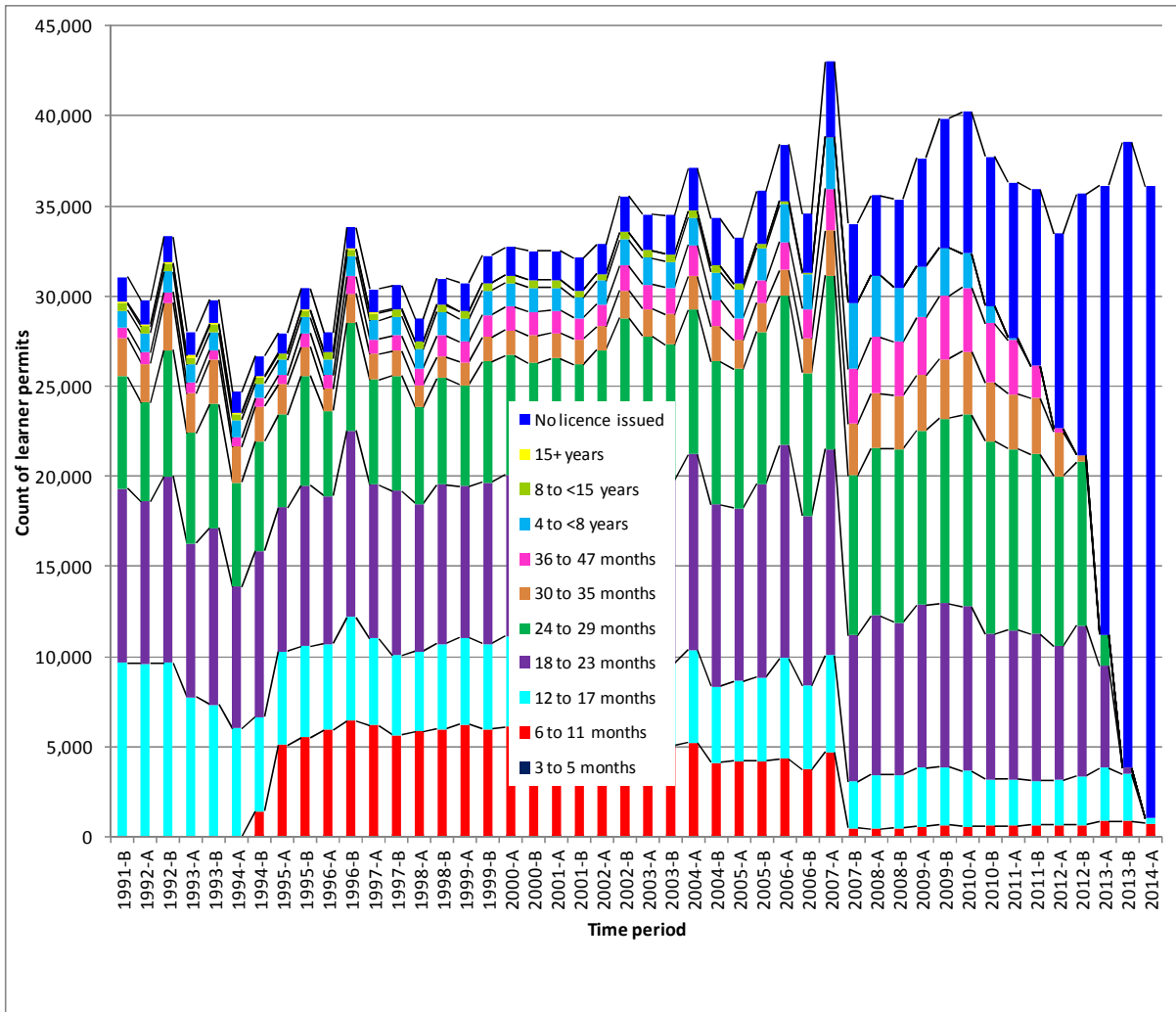


Figure 14: Count of first learner permits issued to drivers aged 16 to 24 years by six monthly periods of permit issue and time the permit held until licence issue

Note: Period A comprises January-June and period B comprises July-December

Initially (from 1991) all permits were required to be held for at least 12 months but a regulatory change in November 1994 reduced the minimum permit tenure to six months. The figure shows the increase in learner permit tenure to between six and eleven months from that point to the first half of calendar year 2007. A sharp dip in the longer term trend then occurred in July 2007 with the new requirement to hold a learner permit for a minimum period of 12 months.

Since July 2007, the numbers holding permits for less than 12 months have therefore dropped significantly, as have the number and proportion of permits held for 12 to less than 18 months from this time. Increases are apparent, though, from July 2007 among those whose learner permit tenures were for 24 months or greater and among those who as yet had not been issued with a licence. As the period of permit issue approached the first half of 2014, it is to be expected that the proportion and number of learner permit holders who had yet to take out a licence would increase rapidly. However, the figure shows that

approximately 16,100 of the nearly 78,000 (approximately 21%) who had taken out a learner permit in 2010 (aged 16 to 24 years) had not taken out a licence by the first half of 2014. The figure does point to an increased delay in licensure post-GLS.

The changes to the lengths of time that permits are held arising from the introduction of the minimum 12 month learner permit requirement and the mandated minimum 120 hours of supervised practice are illustrated in Figure 15.

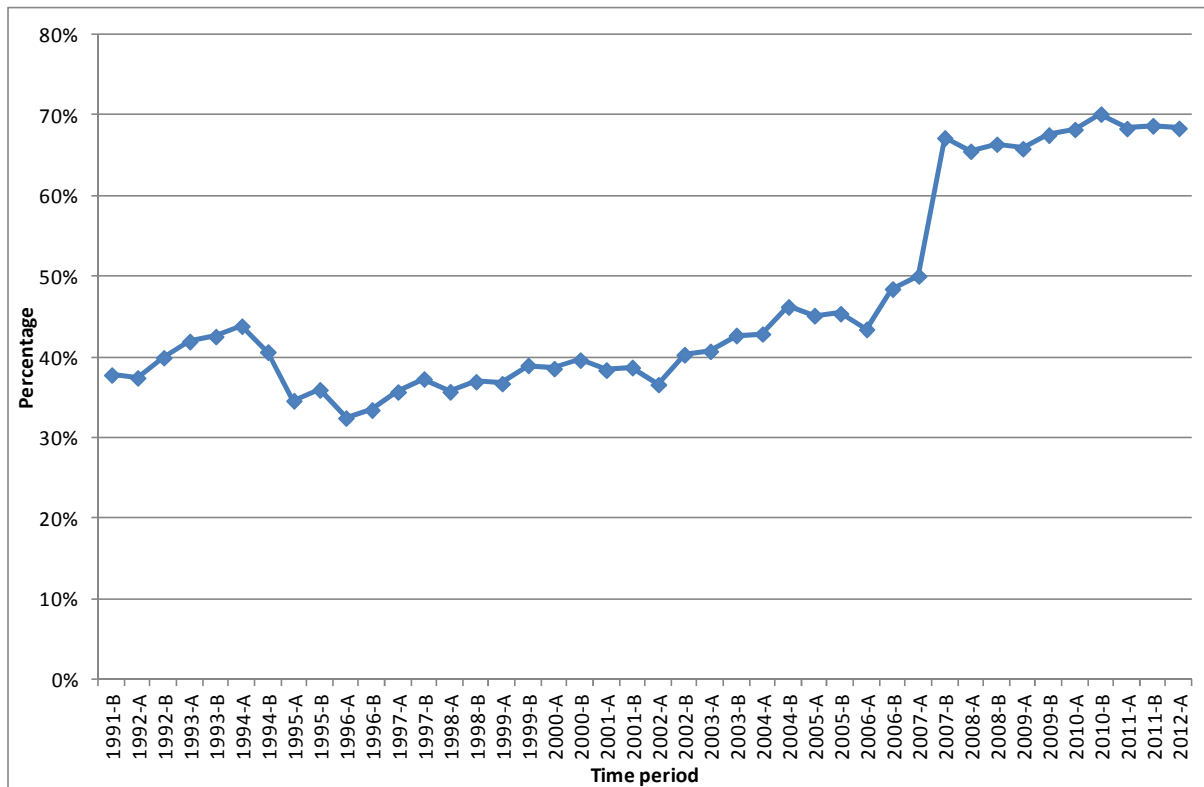


Figure 15: Percentage of new first learner permit holders aged 16 to 24 years who held the permit for at least two years before obtaining a licence by period of issue

Note: Period A comprises January-June and period B comprises July-December

The figure shows that the percentage of young adults holding a permit for at least two years climbed very slowly from 1996 onwards, and then jumped very sharply in the second half of 2007. This jump is almost certainly attributable to the new learner permit requirements accompanying the GLS. Nearly 70% of young adults with learner permits now hold them for at least two years before taking out a licence, in contrast to about 45% before July 2007.

The changes in levels of supervised practice hours for learners over time and the accompanying increases in learner permit tenure described above have a direct influence on licensing rates and the age profile of new licensees. This is discussed in the next section.

Trends in driver licensing

Licensing trends by gender

Figure 16 shows the count of first licences issued to drivers aged 18 to 24 years by gender for the financial years 1991/92 to 2013/14.

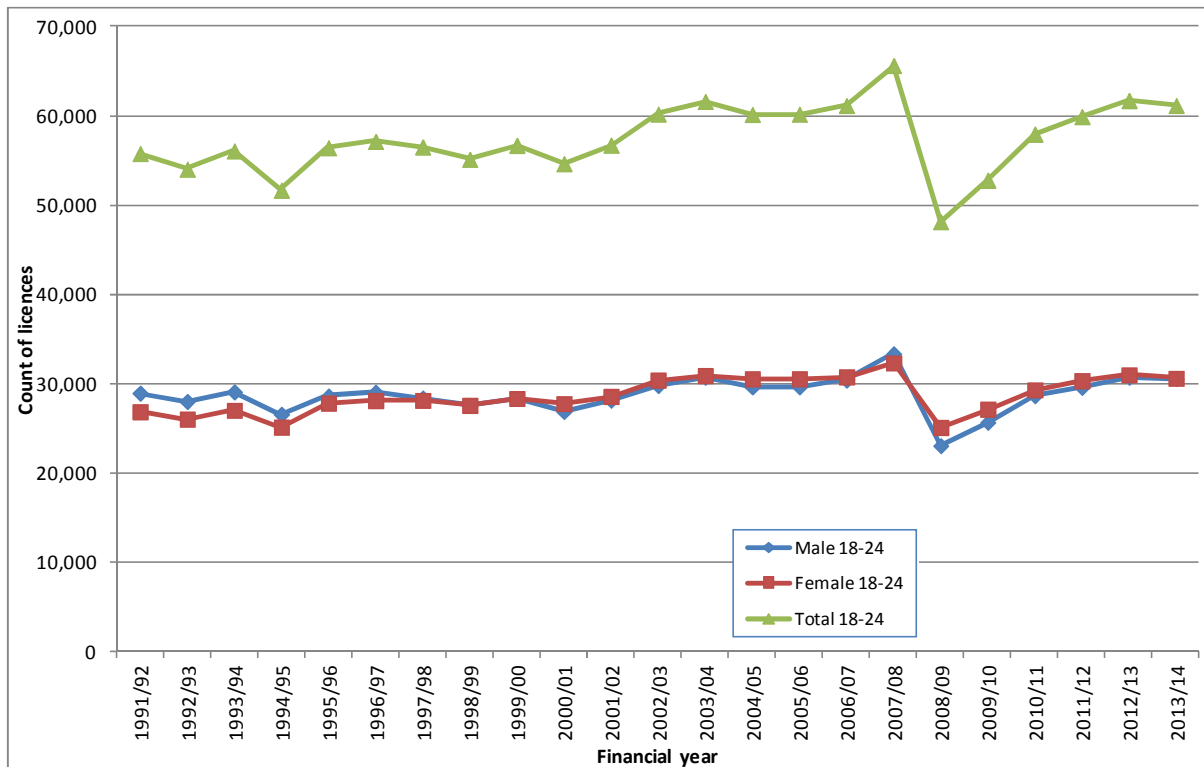


Figure 16: Count of first licences issued to drivers aged 18 to 24 years by gender and financial year

The figure shows that the number of first licences being issued to males and females and their trends over the years were very similar. In keeping with the profile for licensing rates per head of population shown in Figure 12, licence issue peaked in 2007/08 and then dipped sharply in 2008/09 - the first year of enhanced GLS licensing arrangements, including the 120 hour practice, minimum 12-month learner permit tenure and new Drive Test requirements. Subsequently, licensing numbers began to climb again and level out from 2012/13. Total new licences issued in 2012/13 for drivers aged 18 to 24 years were similar in number to licences issued in the years leading up to introduction of the enhanced GLS. In view of the population increase over the intervening years, this equates to a lower rate of licence issue per head of population, as shown in Figure 12.

Licensing trends by age at licence

Given the enhanced GLS applies differing requirements depending on age at licence issue (for example, those aged 21 and over at the time of licensing do not need to complete a

minimum 120 hours of supervised practice), it is instructive to examine differences in licence numbers issued by single year of age in the range 18 to 24 years. Figure 17 portrays these numbers over the financial years 1991/92 to 2013/14.

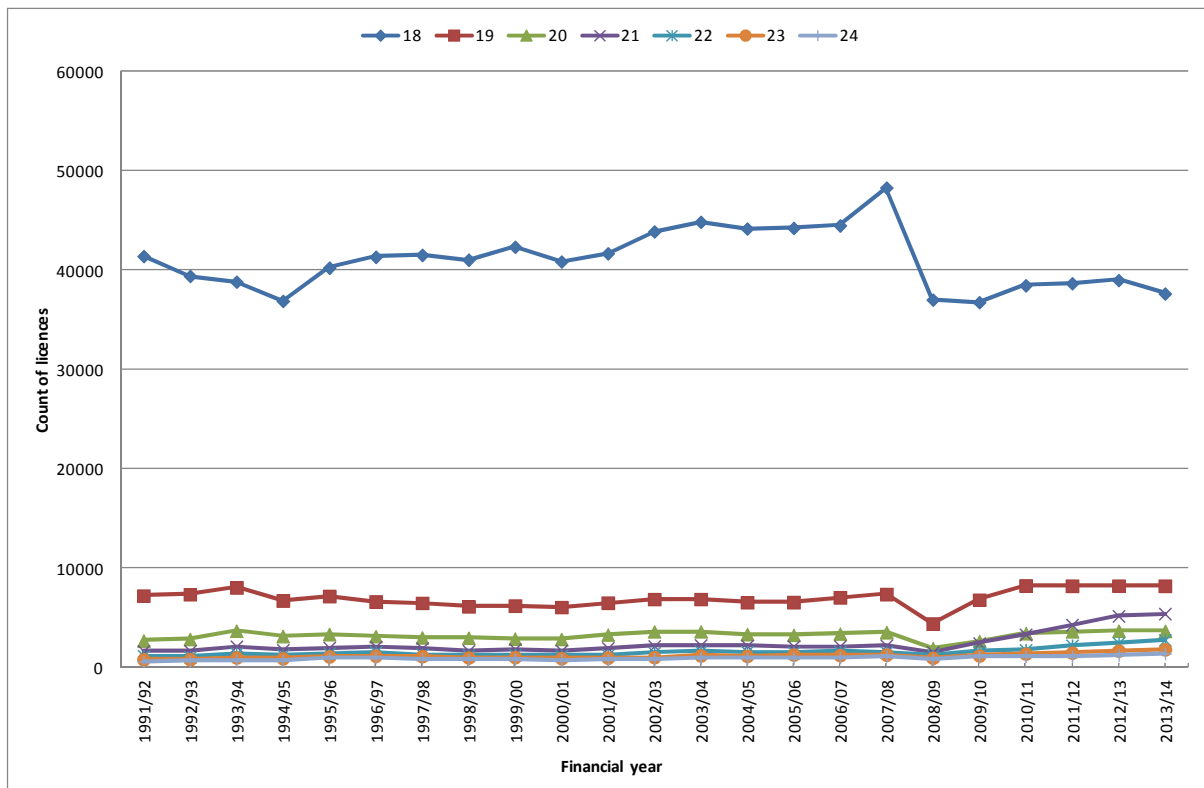


Figure 17: Count of first licences issued by age and financial year

The number of first licences issued is by far the greatest for 18 year olds and declines rapidly by increasing age. The rise in new licence numbers in 2007/08 and the dip in 2008/09 is most pronounced for 18 year olds followed by 19 and then 20 year olds. A small dip is discernible for those aged 21 to 24 years.

Following the dip in 2008/09, the number of first licences issued to 18 year olds recovers only slightly, and remains below pre-2008 levels. The number of licences issued to 19 year olds, however, recovers strongly after the dip, with the numbers each year being higher after the dip than before. The most substantial rise is for 21 year olds. Before the GLS, licences issued to 21 year olds were about two-thirds the number issued to 20 year olds; by 2013/14, licences issued to 21 year olds were nearly 50% higher than those issued to 20 year olds.

These disparate trends among those aged 19 to 24 years at licence are depicted more clearly in Figure 18, which omits 18 year olds.

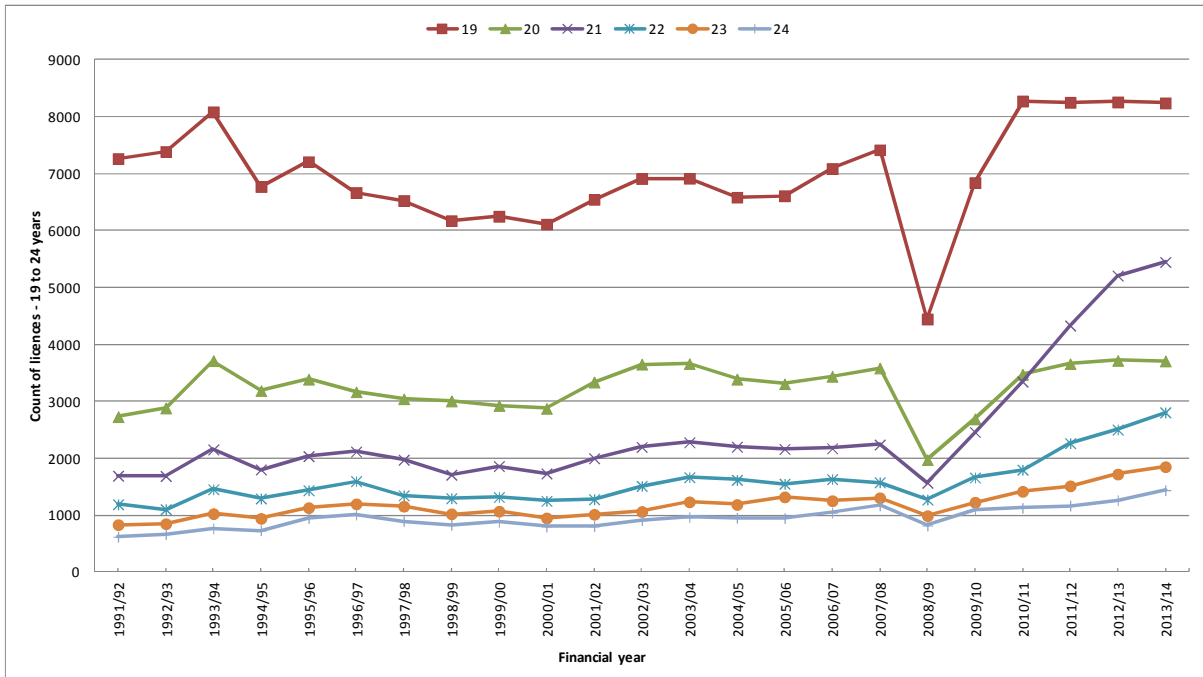


Figure 18: Count of first licences issued by age and financial year (excludes 18 year olds)

The count of licences aggregated across the two age groups, 18 to 20 years and 21 to 24 years by gender and financial year are shown in Figure 19 and Figure 20.

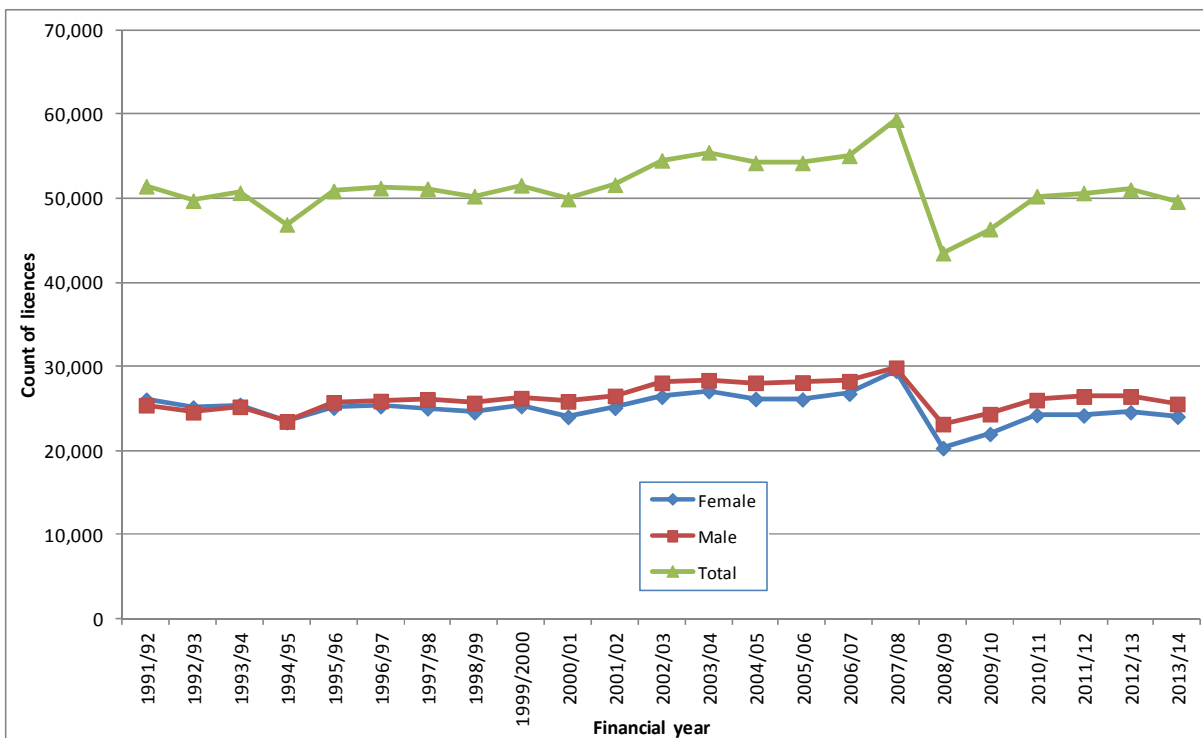


Figure 19: Count of first licences issued to drivers aged 18–20 years by financial year by gender

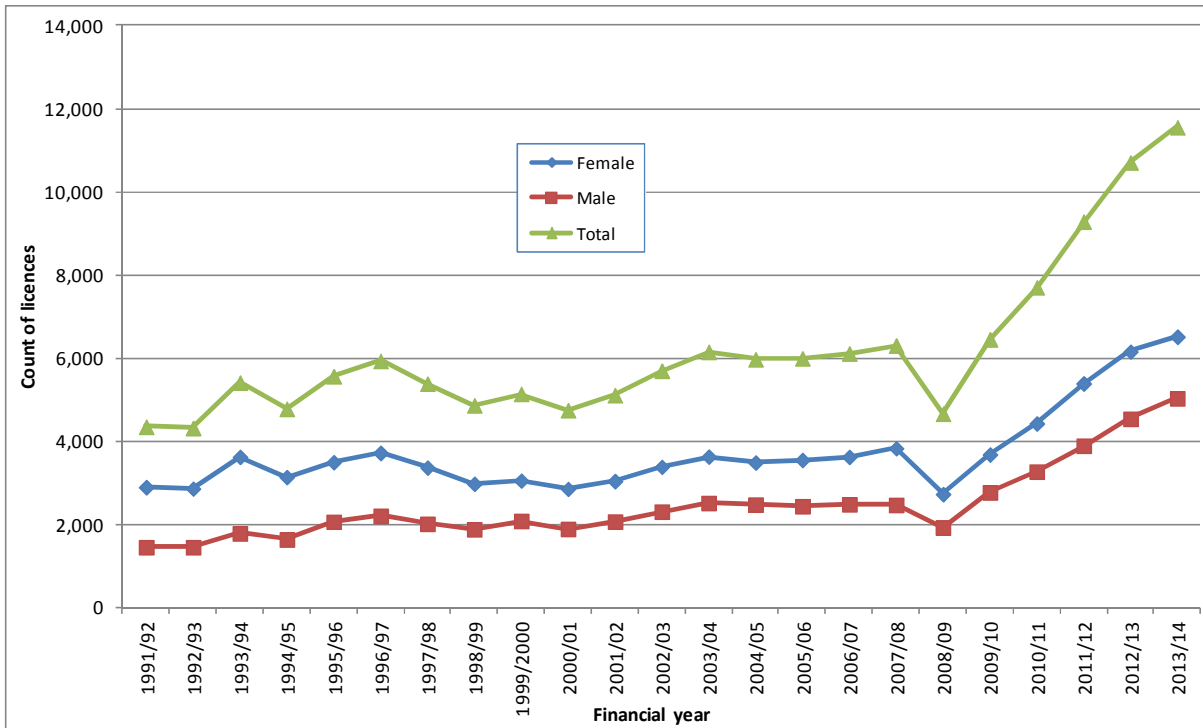


Figure 20: Count of first licences issued to drivers aged 21–24 years by financial year by gender

By aggregating licences into the two age groups, Figure 19 and Figure 20 point to the similarity of male and female licensing profiles over time but with disparate trends between the younger and older licence groups post-GLS introduction. There is a steady growth in those aged 21 to 24 years at licence each year after the dip in 2008/09. For those aged 18 to 20 years at licence, the number of licences issued each year peaks in 2007/08 then drops sharply in 2008/09, driven largely by the drop in 18 year old licence-holders. Licence numbers rebound to some extent in the following two years but do not reach the levels before the GLS introduction.

While the total number of licences issued per annum to drivers aged 18 to 24 years has returned post-GLS to levels similar to those before its introduction, Figure 21 below shows that the age profile of young adults at licence issue has changed.

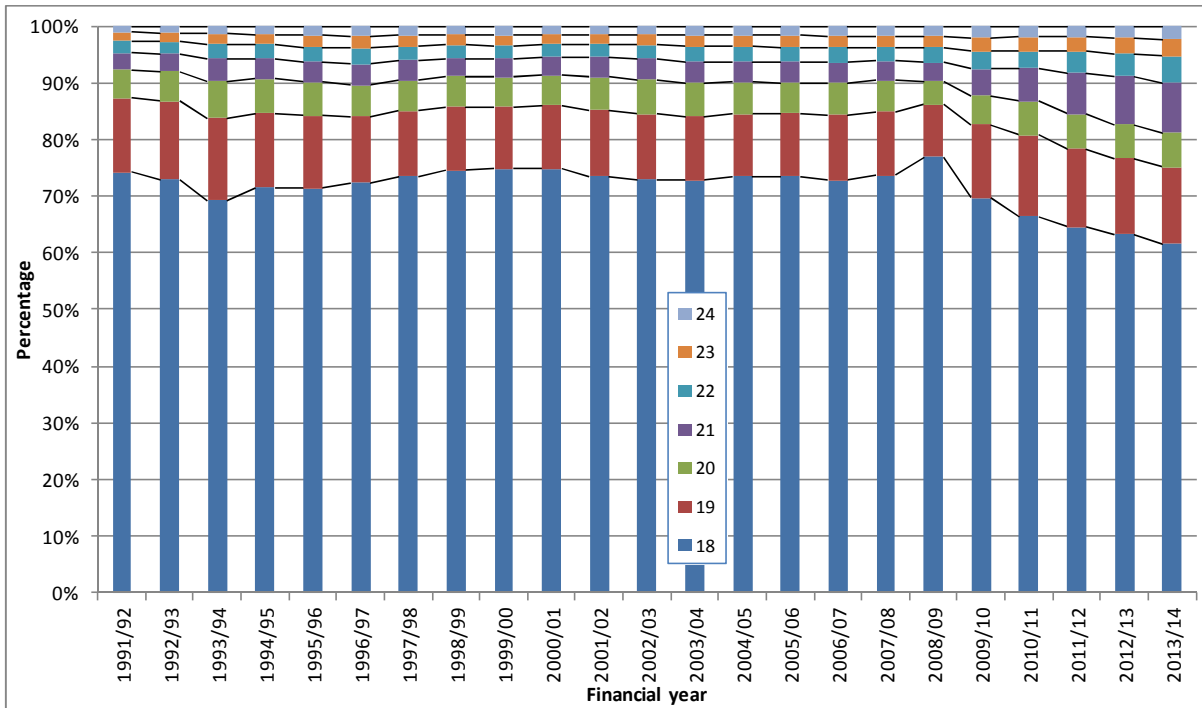


Figure 21: First licences issued by single year of age as a percentage of licences issued within the age band 18 to 24 years by financial year

The figure clearly shows that the percentage of licences issued to 18 year olds has decreased since the GLS introduction from approximately 74% to 62% of licences issued by 2013/14. The figure suggests that change was continuing to occur in 2013/14 but with some signs of levelling off to a new ‘steady state’. For 19 year olds, the number of licences issued rose from 11% since GLS introduction to 14% by 2013/14. This suggests that postponement of licensing is not necessarily related to escaping the 120 hour requirement, but also possibly fulfilling the 120 hour requirement coupled with a 12 month minimum learner permit period.

There were small proportional increases among those licensed at ages 19 and 20 years with the most marked proportional increase in licences issued being for those aged 21 to 24 years at licence - from 10% in the years before 2008/09 to 19% in 2013/14.

The changing profile of licensing ages points to the real possibility that some young people are choosing to postpone licensing to avoid the P1 licensing stage and a minimum 120 hours practice requirement that apply to drivers licensed before age 21.

Licensing trends by region

Figure 22 shows the count of first licences issued to drivers aged 18 to 24 years by region of Victoria as indicated by the driver’s residential address.

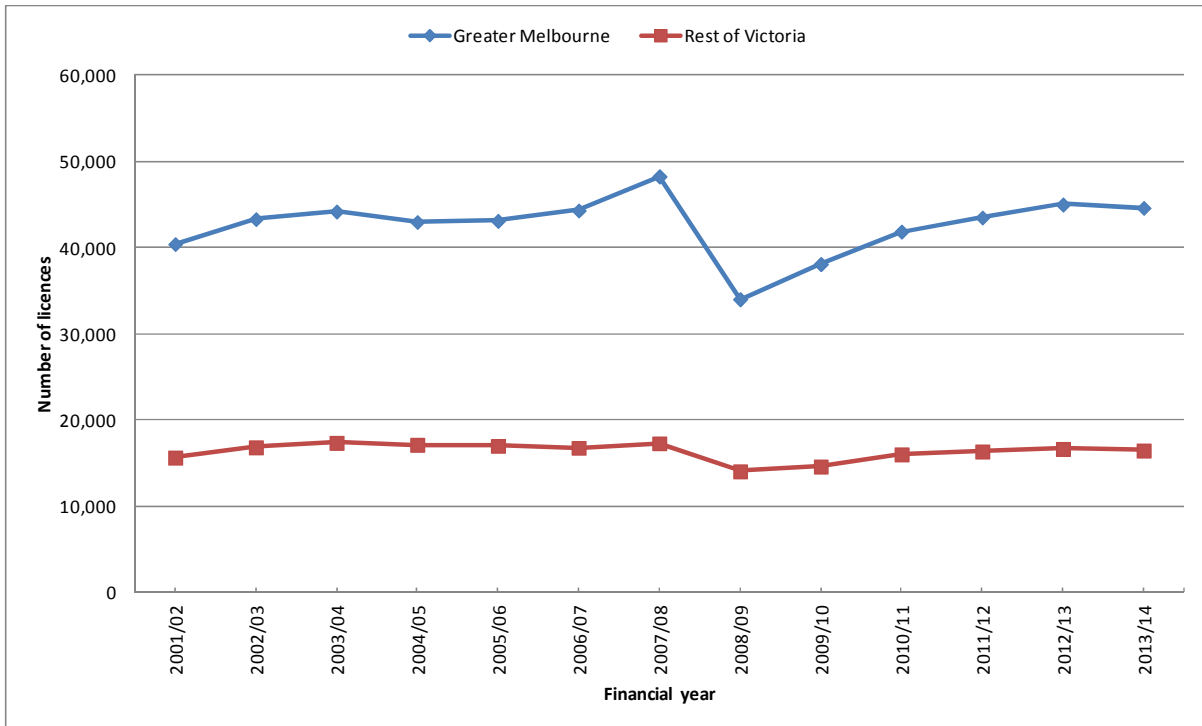


Figure 22: Count of first licences issued to drivers aged 18 to 24 years by region and financial year

The trends in licence numbers for Greater Melbourne largely reflect the trends portrayed in earlier figures - licence numbers peaking in 2007/08, a sudden and substantial drop in 2008/09 and a gradual recovery thereafter. The pattern appears to be similar but less pronounced for licences issued to young drivers in Regional Victoria.

In order to better discern differences in patterns of licensing between those young drivers resident in Greater Melbourne and those in Regional Victoria, the ratio of their respective licence numbers is plotted in Figure 23. It shows that the ratio rises quite steeply to a local peak in 2007/08, drops sharply in 2008/09 and then rebounds strongly in the following year. This profile suggests that learners in Greater Melbourne may have been more likely than those in Regional Victoria to bring forward their licence test in advance of the GLS. As a result, there was a greater dip in the first year of the enhanced GLS for licences issued in Greater Melbourne compared with Regional Victoria. Figure 24 shows this same ratio on a monthly basis in the periods immediately preceding and following the GLS introduction.

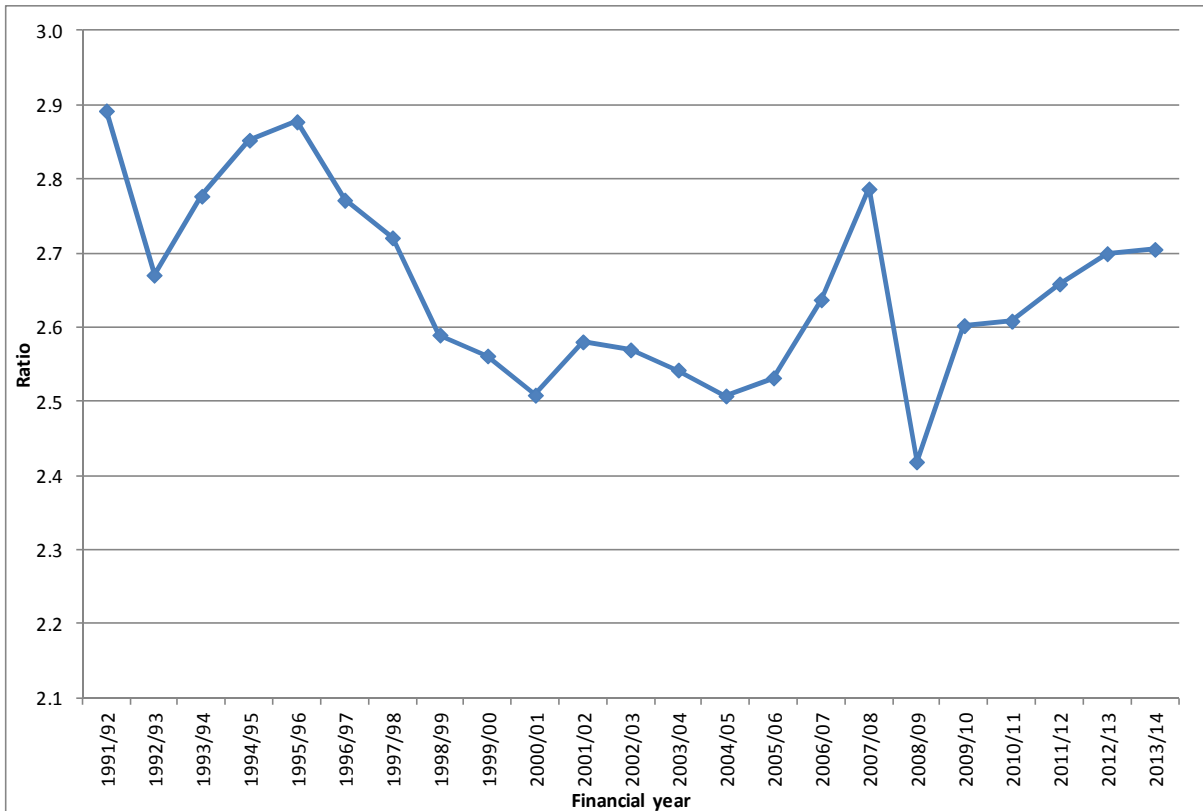


Figure 23: First licences issued to drivers aged 18 to 24 years: ratio of Greater Melbourne to Regional Victoria by financial year

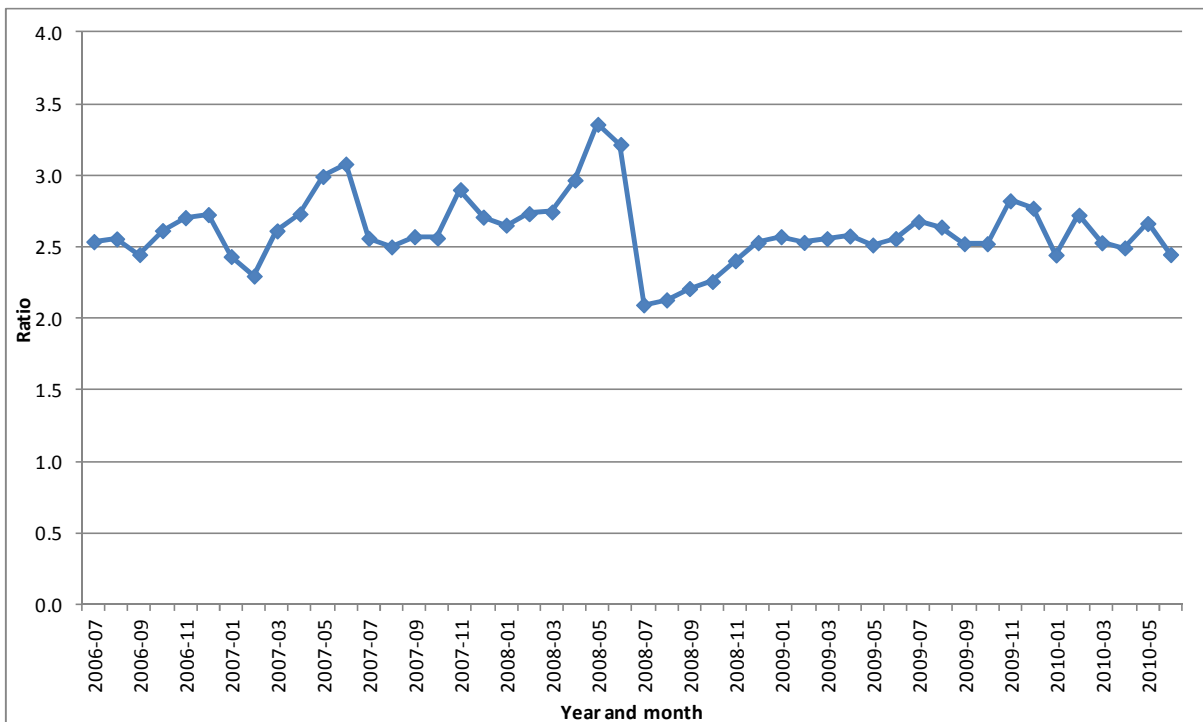


Figure 24: First licences issued to drivers aged 18 to 24 years: ratio of Greater Melbourne to Regional Victoria by single month

The profile in Figure 24 suggests that learners in Greater Melbourne were more likely than their counterparts in Regional Victoria to bring forward their licence test in advance of the GLS licensing provisions applying. By 2009, the ratio had bounced back and then plateaued.

In summary, licences issued to drivers aged 18 to 24 years did increase just before the GLS and then dipped post its introduction for both Victorian regions, but these changes were more pronounced for Greater Melbourne. Numbers of licence issues post-GLS in both regions gradually increased over time to levels similar to those pre-GLS.

Licensing trends by time permit held

Figure 14 earlier in the chapter showed the profile of learner permits issued within six monthly periods of permit issue and time the permit was held until licence issue. Figure 25 describes a similar profile, but for the number of licences issued by time learner permit held for drivers aged 18 to 20 years

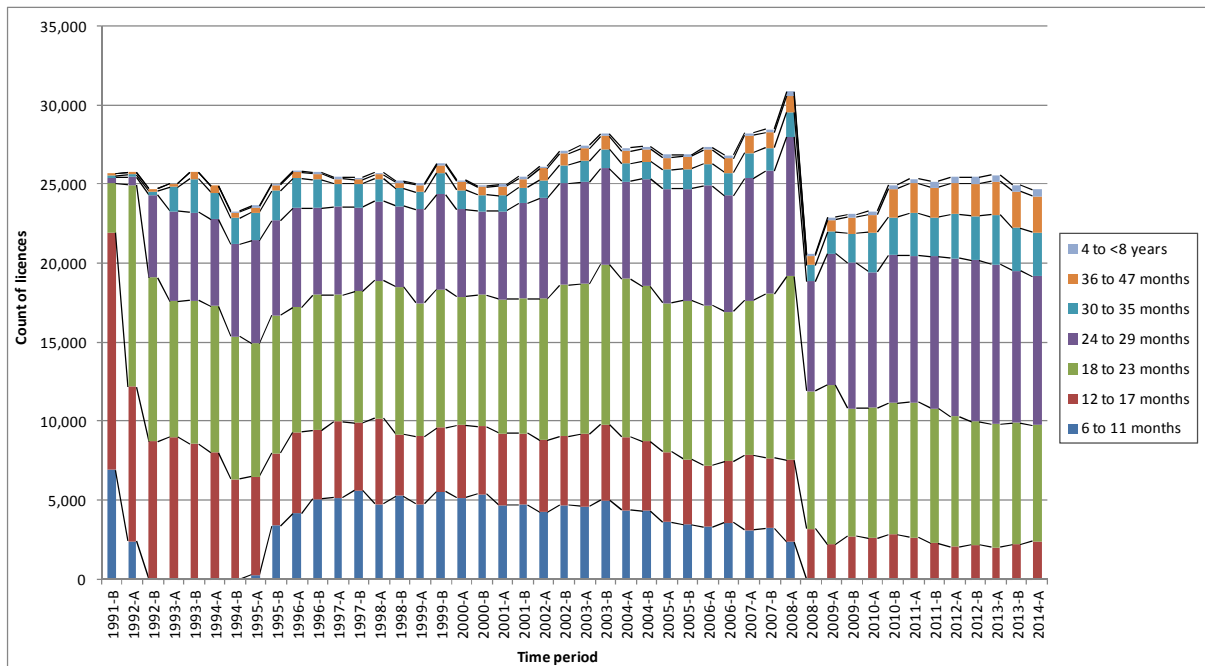


Figure 25: Count of first licences issued to drivers aged 18 to 20 years by period of licence issue and elapsed time from first learner permit issue to first licence issue

Note: In each calendar year, period A comprises January to June and period B comprises July to December

The dislocation in the series is again apparent in the immediate lead up to and following the GLS introduction on 1 July 2008. Following the immediate dip in licensing with the GLS, licensing numbers for those aged 18 to 20 years increased significantly from 2009 onwards and levelled off commencing 2010/11 at levels a little below those in the years leading up to the enhanced GLS. Particularly relevant is the significant proportional increase post-GLS in new licensees who have held a learner permit for at least 24 months - from 37% pre-GLS to 60% post-GLS.

Figure 26 shows the equivalent breakdown by time elapsed from learner permit issue to licence issue for drivers licensed at ages 21 to 24 years. As was the case for licensees aged 18 to 20 years, a dislocation in the trend of new licences issued is evident at the time the enhanced GLS was introduced. The ‘bounce back’ post-GLS in total licence numbers to a level well above that in the years leading up to the change is evident from the figure and represents a marked contrast in trend compared with those aged 18 to 20 years at licence. Of note is the significant increase in licensees aged 21 to 24 years who held a learner permit for at least three years, from approximately 41% pre-GLS to 66% in 2013/14.

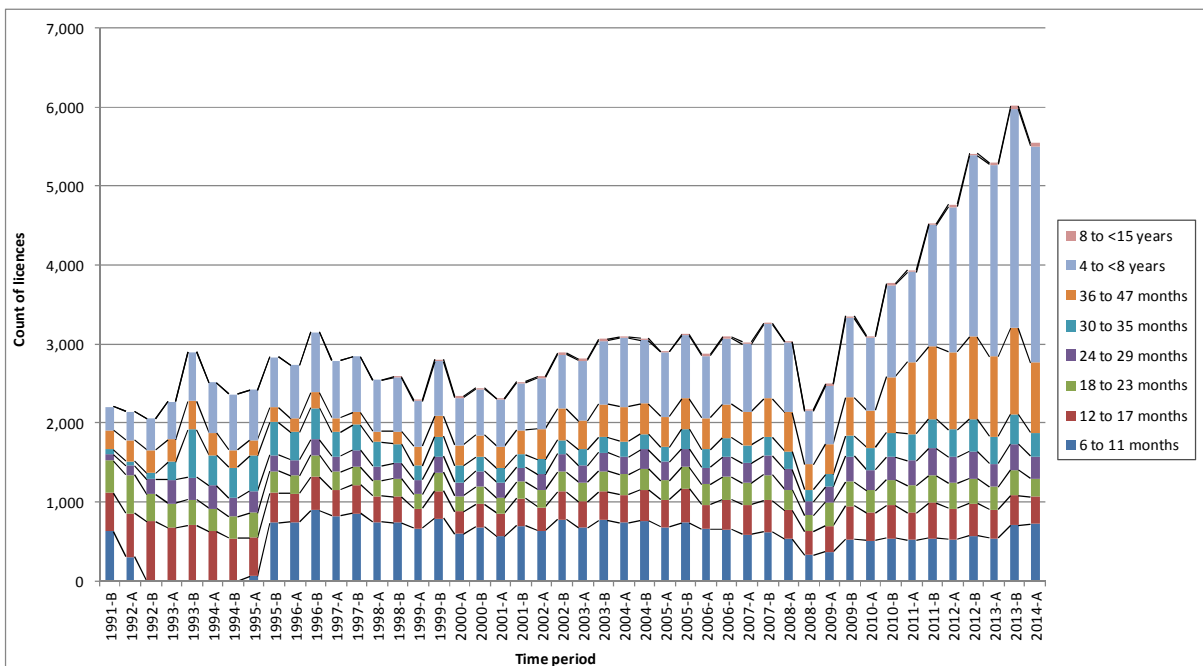


Figure 26: Count of first licences issued to drivers aged 21 to 24 years by period of licence issue and elapsed time from first learner permit issue to first licence issue
 Note: In each calendar year, period A comprises January to June and period B comprises July to December

It is apparent that the GLS disrupted licensing trends at the time of its introduction and has influenced subsequent disparate growth profiles in licensing trends for those aged 18 to 20 years and those aged 21 to 24 years at licence. The changing age profile of licensees suggests that some young people are choosing to postpone licensing until they sit for a P2 licence at age 21 years or older.

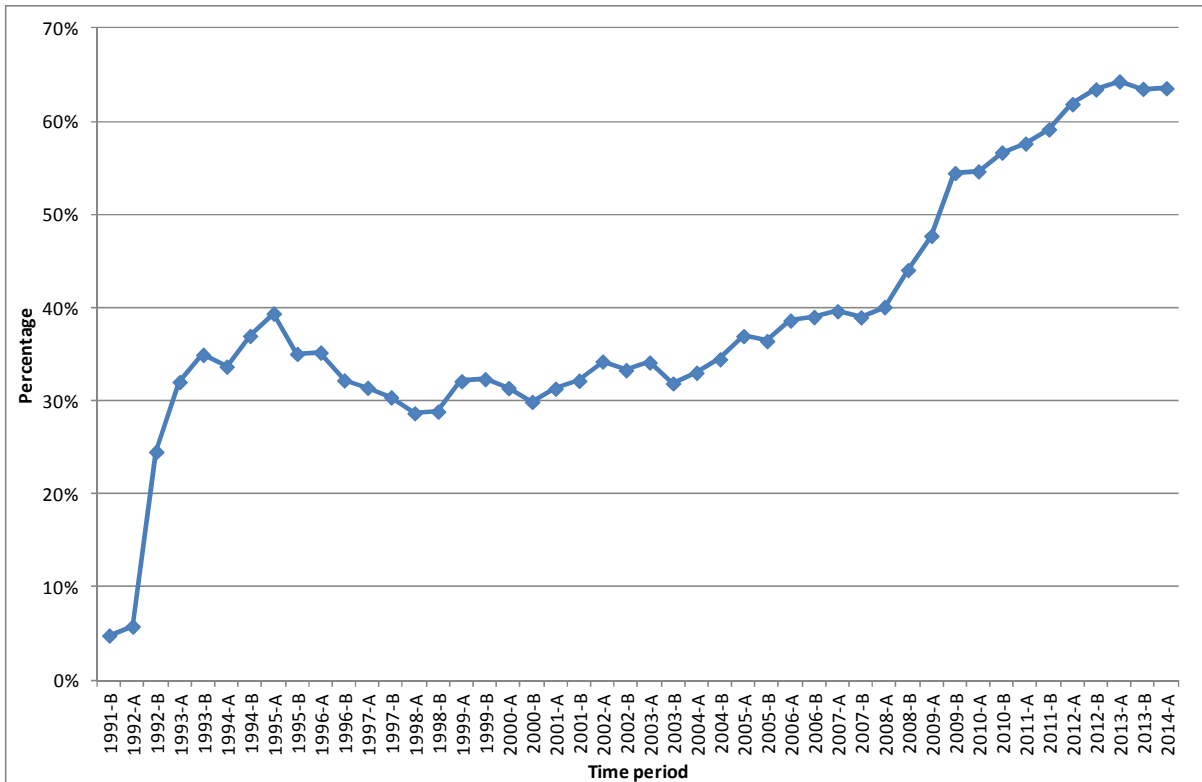


Figure 27: Percentage of new first licence holders aged 18 to 24 who had held the learner permit for at least two years by period* of licence issue

* In each calendar year, period A comprises January to June and period B comprises July to December

Figure 27 shows a continually increasing proportion of 18 to 24 year old licence-holders who held their learner permit for at least two years from 2009 onwards, with a new ‘steady state’ in this proportion beginning to form in the last half of 2013.

One factor that may have caused some young people either to defer applying for a licence or from successfully obtaining a licence at the earliest opportunity was the introduction of a new Drive Test which replaced the former Programmed Observation Licence Assessment (POLA) on 1 July 2008. The on-road Drive Test assesses driver proficiency in higher-order cognitive skills that are developed through extensive, graduated supervised on-road driving practice (Cavallo & Oh 2008).

Licensing trends and the Drive Test

Figure 28 shows the number of practical Drive Test attempts undertaken by young people by single year of age. The number of test attempts is far higher for 18 year olds than for all other ages, with attempts peaking in 2007 and 2008, most likely due to a substantial number of learners attempting the licence test in advance of the GLS introduction. From 2009 onwards, the number of test attempts by 18 year olds gradually declined, which may be attributable to a range of influences including longer term decreasing trends in licensing

rates among the young and the increased time spent as learner permit holders under the enhanced GLS provisions.

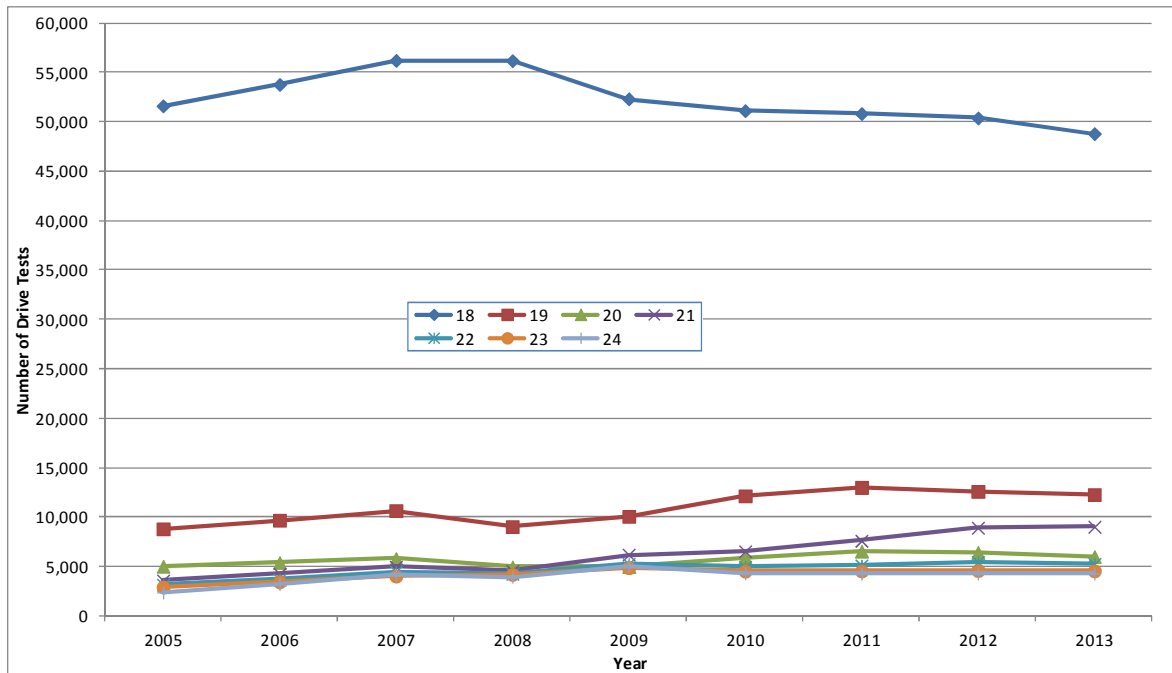


Figure 28: Number of Drive Test attempts by single year of age (18 to 24 years) [counts multiple attempts by the same person]

In contrast to the trend post-GLS for 18 year olds, test attempts among 19 year olds increased from 2009 onwards and, to a lesser extent, among 20 year olds. An increase in test attempts by 46% was evident among those aged 21 years, almost doubling within a five year period.

Figure 29 shows the Drive Test pass rate by single year of age over the period 2005 to 2013. The pass rate progressively reduces from the youngest to oldest applicant group with the lowest rate for all ages occurring in the year following GLS introduction. From 2010 onwards, pass rates began to increase across all ages and returned to a level nearly 5% lower than those in 2006. The drop in pass rates in 2009 may well reflect the unfamiliarity of applicants and driving instructors with the Drive Test and the ability of the test to measure cognitive skills that develop through sustained supervised driving practice.

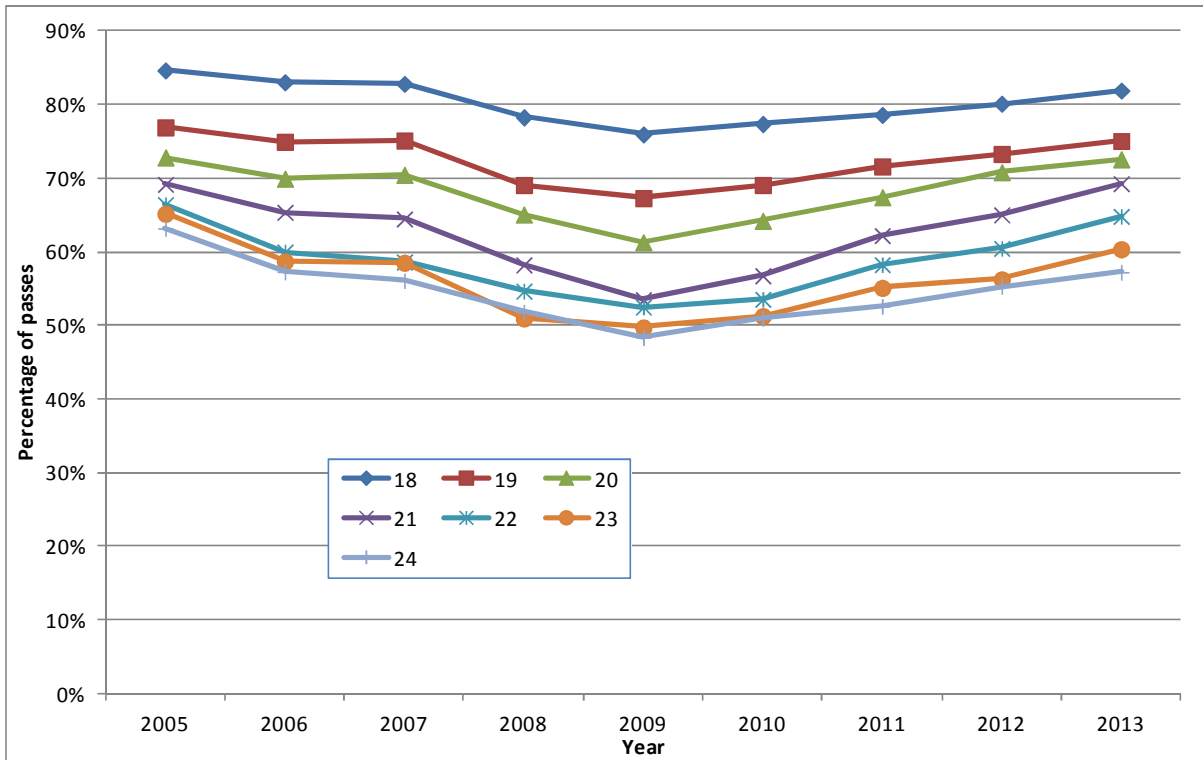


Figure 29: Practical Drive Test pass rate by single year of age

Figure 30 shows the number of Drive Test passes by single year of age for the period 2005 to 2013. For each age, the number of passes peaked in 2007 then dropped in the first year of the GLS. The drop in passes continued for 18 year olds into 2009 and then plateaued at a level well below that in the lead up to the GLS. Drive Test passes increased in number commencing in 2009 amongst 19 and 21 year olds.

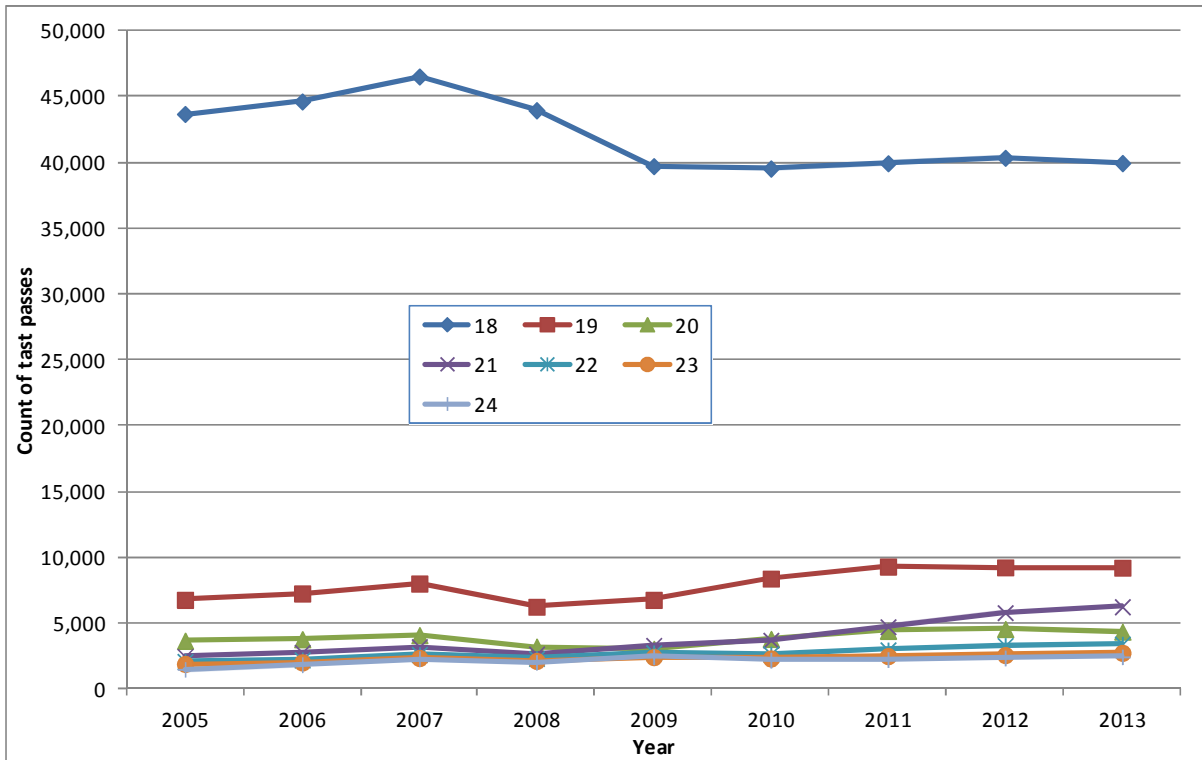


Figure 30: Count of practical Drive Test passes by single year of driver age

Licensing age profile for a cohort of 18 year olds, pre and post-GLS

Trends depicted to date in this chapter have pointed to a redistribution of ‘age at licence’ profile following the introduction of the GLS on 1 July 2008. A higher proportion of young people take out licences at a later age than was the case in the lead up to the enhanced GLS. One way of viewing this redistribution is to follow a cohort of young people aged 18 and then observe the age at which they took out a licence. A comparison can then be made between the licensing age profile over time of a young cohort before and after the GLS was introduced.

Figure 31 shows the redistribution by age of the numbers licensed before and after the GLS. It compares the cohort who were aged 18 years at any time in 2003 (i.e. who turned 18 between 1 January 2002 and 31 December 2003) with a corresponding group post-GLS who were 18 years of age at any time in 2010 (i.e. who turned 18 between 1 January 2009 and 31 December 2010). The figure shows for the pre-GLS group the number of Victorian licences taken out by 18 year olds in 2003, by 19 year olds in 2004 and so on. Similarly, the number of licences taken out by 18 year olds in 2010, 19 year olds in 2011 and so on for the post-GLS cohort, are also shown for comparative purposes.

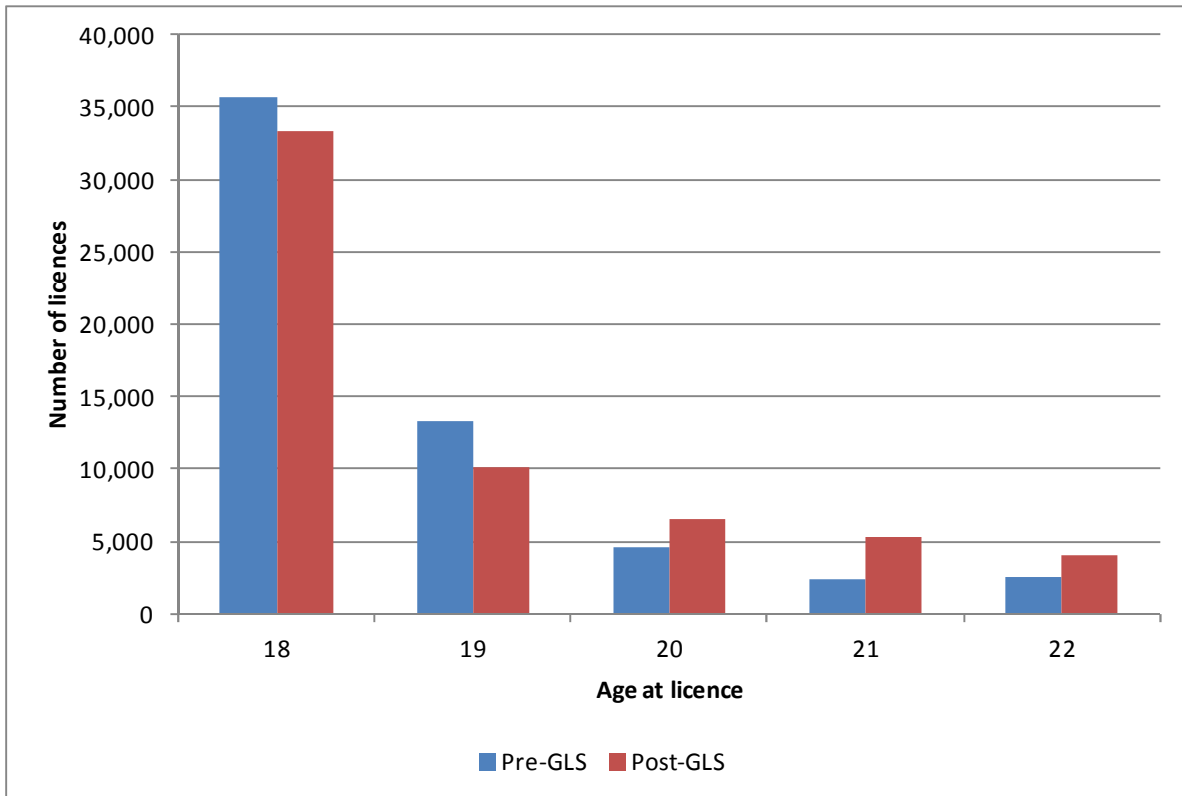


Figure 31: Numbers licensed by age at licence for 18 year old cohorts, pre and post-GLS

Note: Pre-cohort: 18 years of age in 2003; post-cohort: 18 years of age in 2010

The licence age profiles shown in Figure 31 for pre and post-GLS cohorts of young people should be viewed as approximate only, as young people who come to Victoria from either interstate or overseas and acquired a licence in the age range 18 to 22 years were included within the licence tallies (whereas in all the previous figures young people first licensed interstate were removed).

There is a re-distribution of licences from younger to later ages with the GLS introduction. The shift to a later age at licence post-GLS cannot be totally accounted for by the desire to avoid a P1 licence. The increase in those taking out a licence at 20 years of age post-GLS, and so subject to the provisions of both the P1 and P2 phases of the GLS, indicates other influences are also at work. The requirements to hold the permit for at least 12 months and accumulate at least 120 hours of supervised experience most probably have delayed licensing even among those willing to go through the P1 licence stage.

Summary

The results from this chapter indicate:

- In the lead up to the introduction of the enhanced GLS, licensing rates per head of population were relatively steady for each year of licensing age, 18 to 24 years.

- The number of first licences issued peaked (to around 66,000) in 2007/08 in advance of the GLS and then dipped in 2008/09 (to around 48,000) with the dip most pronounced for 18 year olds, followed by 19 and then 20 year olds.
- The number of licences issued rebounded following the dip, most strongly for those aged 21 to 24 years at licence; while for 18 year olds, the recovery was only slight with levels remaining below those pre-2008.
- Licensing profiles for males and females were similar over time.
- Licensing profiles for those licensed in the Greater Melbourne and Regional Victoria were similar over time, but with a dip pre-GLS (2008/09) and a rebound after the introduction of the GLS (2009/10 to 2012/13) being more pronounced for the Greater Melbourne area.
- A new profile across licensing ages, 18 to 24 years, emerged with 18 year olds dropping from 74% to 62% of new licences issued while 21 to 24 year olds comprised 19% of new licensees in 2013/14 compared with 10% before the GLS.
- For 19 year olds, the number of licences issued rose from 11% since GLS introduction to 14% by 2013/14. This suggests that postponement of licensing is not necessarily related to escaping the 120 hour requirement, but also possibly fulfilling the 120 hour requirement coupled with a 12 month minimum learner permit period.
- Learner permit tenure has increased considerably since GLS introduction. Sixty percent of 18 to 20 year olds have held a learner permit for at least 24 months compared with 37% pre-GLS. For those aged 21 to 24 at licence, the equivalent figures were 66% post-GLS versus 41% pre-GLS for learner permits held for at least 36 months.
- Practical Drive Test pass rates reached their lowest level with the introduction of the new test, and then increased year on year (2009 to 2013) post-GLS to reach levels in 2013 that were slightly lower than those in 2005.

Discussion

The GLS introduction has resulted in a number of changes that directly influenced the licence issue age profile of young Victorian drivers. Short-term changes were evident in the lead up to and immediately after the introduction of the new learner permit requirements as at 1 July 2007 and of the four year probationary licence on 1 July 2008. Some young people chose to take out their learner permits before the former date and their probationary licence in advance of the latter date. A corresponding dip in rates of learner permit and licence acquisition was evident in the first year of GLS operation. The dip (in 2008/09) and rebound (from 2009/10 to 2012/13) were more pronounced for Greater Melbourne.

Since the GLS introduction, the profile of 'age at licence' has evolved over time with fewer 18 year olds taking out licences, a modest increase among 19 year olds and an increase in the proportion of those aged 21 to 24 years growing from around 10% pre-GLS to approximately 19% of all new licence-holders aged 18 to 24 years in 2013/14. The trend towards later licensing is reflected in the significant increase of young learners' length of learner permit tenure with the GLS introduction.

It is likely that a combination of factors related to the GLS requirements contributed to the changed age licensing profiles. The 12 month minimum learner permit requirement coupled with the need to log a minimum 120 hours of supervised driving practice under the enhanced GLS regime may well have been responsible for an increase in 19 and 20 year olds and a corresponding reduction in 18 year olds taking out licences in the post compared with the pre-GLS period. A further possible influence was the introduction of the new Drive Test that caused some young people to be unsuccessful in obtaining a licence at the earliest opportunity. The new on-road Drive Test assesses driver proficiency in higher-order cognitive skills that are developed through extensive, graduated supervised on-road driving practice (Cavallo & Oh 2008). A young person without adequate on-road driving experience as a learner is unlikely to pass the test.

An additional influence on choice of licensing age is the two-tiered structure of the enhanced GLS. Those aged 18 to 20 years are subject to the four year probationary period (P1 and P2 licences), which includes a peer passenger restriction in the P1 phase. Those aged 21 years or older are only subject to the three-year P2 phase and not required to log a minimum 120 hours of supervised practice as a learner. The progressive increase in new licence-holders aged 21 years, but also to some extent, those aged 22 to 24 years strongly suggests that a number of young people have chosen to postpone sitting for a licence until aged 21 years or even older.

Delbosc and Currie (2013), in a survey of over 200 young adults in Melbourne, reported that for those who were yet to take out a learner permit, their main reasons were a preference for spending their money on other things, the cost of motoring and a reliance on other forms of transport and social media for communicating. For those who did not intend to take out a learner permit, difficulties in getting 120 hours of practice and P-plate restrictions were deemed to be less important. Despite these reported outcomes, it is possible that the requirements of the enhanced GLS on top of existing reasons, such as listed above, provided further impetus for some young people to postpone taking out a licence.

These changes in licensing trends have implications for how the impact of the enhanced GLS on crash involvements of young drivers was assessed. Firstly, the progressive shift

over several financial years to a new licence age profile post-GLS introduction means that a sufficient time gap needed to be left post-GLS introduction before measuring crash involvements after the transitional phase had ended. Similarly, a gap also had to be left in the lead up to introduction of the GLS to eliminate short term effects as learner permit and licence acquisition numbers climbed in advance of introducing the GLS. Therefore, for the majority of crash analyses, a four year window from 2007/08 to 2010/11 was not included due to the appreciable change in licensing trends over this period. In addition, the migration of some young people to later licensing means that the crash evaluation should not only consider the impact separately on those aged 18 to 20 years and those aged 21 to 23 years at licence, but also the impact upon these two age groups combined.

Separate comparisons of the crash involvements of drivers aged 18 to 20 years at licensing and drivers aged 21 to 23 years at licensing before and after GLS introduction represent an important component of the crash analysis. However, similar cohorts may no longer being compared. The shift in licence numbers from the larger, younger age group to the smaller, older age group may well alter the composition of the 18 to 20 year old cohort to a smaller extent and the 21 to 23 year old cohort to a greater extent in the post-GLS period compared with the pre-GLS period. This changing composition may well express itself in terms of a different crash involvement experience. In other words, differences in crash involvement rates before versus after the GLS may not only reflect the direct influence of the GLS upon crash involvement rates but may, at least to a small degree, be influenced by the changing composition of the young driver cohorts. Any change in crash rates, however, that may result from this migration is nevertheless an important outcome of the GLS.

Accordingly, while it is important to compare the crash rates before and after the introduction of the GLS for 18 to 20 year olds and 21 to 23 year olds separately, there is also a need to consider the net change due to the impact of the GLS upon the 18 to 23 year old cohort as a whole.

CRASH INVOLVEMENT TRENDS

Introduction and aims

The main aim of this chapter is to assess the impact of the GLS and associated measures upon the crash involvements of novice drivers in casualty crashes and in crashes that result in death or serious injury. There are two main ways in which the safety of young people has been influenced in Victoria:

- the measures introduced over the longer term in the lead up to the GLS that have highlighted the elevated risk of young drivers and the merits of acquiring at least 120 hours of supervised driving practice as a learner driver in advance of sitting for a licence
- the impact of the GLS itself upon the crash experience of young drivers.

Both of these measures will be addressed, the former in terms of general trends over time and the latter through a series of before and after comparisons, each of which addresses a facet of the enhanced GLS.

This chapter comprises six parts, each with specific research questions and data analysis procedures to address them:

- age at crash involvement over time
- age at crash involvement – before and after GLS comparison
- time since first licence – before and after GLS comparison
- alcohol crash involvement – before and after GLS comparison
- peer passenger crash involvement – before and after GLS comparison
- learner permit holder crash involvement over time.

Method

Licensing data

Licence data were obtained from the VicRoads DLS. Available data for each driver included licence number, date of birth, gender, date of issue of first learner permit and first car licence, among other items.

Drivers were excluded from the analyses if gender or date of birth was unknown, a car licence was issued before the age of 18 years or the first Victorian car licence issued was a full licence. Appendix C – Driver exclusions describes the full set of exclusions.

Crash data

All crash data used in the study were obtained from the VicRoads Road Crash Information System (RCIS) and covered the period 2001/02 to 2013/14. The records provided information regarding each crash, about the vehicles and people involved in the crash and about crash locations.

Crashes were categorised according to whether they resulted in:

- fatal or serious injury (FSI crashes) where serious injury involves a hospital casualty department admission, or
- fatal, serious or minor injury (casualty crashes) where minor injury required medical treatment, but did not entail a hospital admission.

The grouping of fatalities with serious injuries was necessary to ensure sample sizes were appropriate for analysis purposes. Crashes were linked with claims information from the Transport Accident Commission, the third party government monopoly insurer in Victoria, to update injury level where available. Crash records were then linked to licensing information for each driver (Catchpole et al. 2016).

Calculation of exposure and crash involvement rates

Exposure was defined as the aggregated number of days in the study period when drivers belonged to a particular driver group (novice or comparison). The crash rate for a driver group was defined as the number of crash involvements per 10,000 driver-years of exposure. Periods of licence ban within the study period for a given driver counted towards the calculated exposure for that driver.

Statistical analysis

Statistical analyses were applied to those sections of the study that entailed before versus after comparisons. Based on expert statistical advice, Poisson Regression Modelling (PRM) was adopted as it was suited to the analysis of crash rates. PRM was used to compare the change in crash involvement rate from the pre-GLS to the post-GLS period for the novice group with the corresponding change for the comparison group, taking into account the influences of all other independent variables, such as age, gender, crash location etc.

In order to build sample size numbers for the purposes of analysis, there was some overlap between membership of the pre-GLS and post-GLS comparison groups for some of the before versus after comparisons. It was possible, therefore, for some drivers to belong to both groups though at different times (meaning that no one crash involvement or day or exposure contributed to the totals for both the pre-GLS and post-GLS periods). In each case,

however, fewer than half the drivers in a given group overlapped with drivers from the other group. Expert advice indicated that the impact of such overlaps on the statistical significance levels generated by the statistical modelling procedure was likely to be small (Catchpole et al. 2016).

Age at crash involvement

Crash reductions

Aims

This section aims to:

- determine the extent to which a series of measures over time targeting new drivers, including the GLS, have been successful in reducing their absolute number of crash involvements
- examine the broad trends over time (13 financial years) of licensed drivers whose age at crash involvement was 18–20/21–23/18–23²⁰ years as well as by individual year of age.

Analysis approach

In order to address the first aim above, crash involvements (casualty and FSI separately) for drivers aged 18 to 20 and 21 to 23 years for the pre-GLS period 2001/02 to 2003/04 were compared with crash involvements for the three year post-GLS period 2011/12 to 2013/14. The corresponding crash involvements for a comparison group, drivers aged 35 to 42²¹ years, were also derived. The analysis approach was chosen to examine change over the full 13 year period by comparing results from a three year grouping at the start of the period with a three year grouping at the end of the period. Three years was chosen to minimise the impact of any year-on-year variability. No statistical testing was undertaken on this analysis, as absolute crash involvement counts and trends were of interest.

Results

Table 17 shows the crash involvement results for drivers aged 18–20, 21–23 and 18–23 years with the corresponding figures for the comparison group (35–42 years).

²⁰ Age ranges were chosen to be consistent with those adopted in the 'before/after' comparison that follows: ages 24 years and older were excluded as it would have resulted in some overlap in membership between the pre-GLS and post-GLS analysis periods.

²¹ The comparison age group was chosen such that no member of the novice groups became a member of the comparison group over the study period.

Table 17: Count of crash involvements by drivers aged 18–20, 21–23, 18–23 and 35–42 years - 2001/02 to 2003/04 (pre-GLS) compared with 2011/12 to 2013/14 (post-GLS), including percent reduction

Type of crash	Age at involvement	2001/02 to 2003/04 (pre-GLS)	2011/12 to 2013/14 (post-GLS)	Percent reduction post GLS
Casualty crash involvements	Age 18–20 years	8443	4396	–48.0%
	Age 21–23 years	5984	3898	–34.8%
	Age 18–23 years	14,427	8294	–42.5%
	Age 35–42 years	6756	4799	–29.0%
FSI crash involvements	Age 18–20 years	1921	1147	–40.3%
	Age 21–23 years	1400	1033	–26.2%
	Age 18–23 years	3321	2180	–34.4%
	Age 35–42 years	1462	1166	–20.2%

The results shown in Table 17 are very favourable. The changes in crash involvement in the comparison group between the post and pre-GLS periods represent the influences from a range of external, ambient factors (e.g. road and vehicle improvements, enforcement activity) that should effect change within both the comparison and novice group equally. Any additional reductions experienced by the novice groups represent the impact of the GLS and its preceding supporting measures together with any additional influences that differentially affected young driver crash involvements. Chief among these potential influences would be differential changes in exposure patterns over time between the novice and comparison groups, which are unrelated to the influence of the enhanced GLS.

Table 17 shows that the reductions in casualty and FSI crash involvements by drivers aged 18 to 20 years (subject to all the provisions of the enhanced GLS) and those aged across the broader range 18 to 23 years are substantially greater than those for the comparison group. The reductions in crash involvements are much greater for drivers aged 18 to 20 years than for those aged 21 to 23 years.

Table 18 shows the average annual exposure as measured in driver-days for the two novice groups and the comparison group for three time intervals - well before, just before and well

after introduction of the enhanced GLS. Exposure figures for year by age can be found in Appendix D – Exposure (driver days by financial year and age)²².

Table 18: Average annual driver-days ('000s) by driver group by time interval

Time Interval	Novice drivers 18 to 20 years		Novice drivers 21 to 23 years		Comparison 35 to 42 years	
	Driver-days (000s)	Percent change from 2001/02–2003/04	Driver-days (000s)	Percent change from 2001/02–2003/04	Driver-days (000s)	Percent change from 2001/02–2003/04
2001/02–2003/04	47,073	NA	56,964	NA	144,720	NA
2006/07–2007/08	49,654	+5.5%	60,033	+5.4%	154,340	+6.6%
2011/12–2013/14	44,006	–6.5%	60,373	+6.1%	149,750	+3.5%

Table 18 shows that percentage increases in exposure were very similar across all three driver groups up to the introduction of the GLS. With the introduction of the GLS, however, exposure dropped measurably among drivers aged 18 to 20 years as was observed in the Learner Permit and Licensing Trends Chapter with the apparent migration of some drivers to obtaining a licence at a later age.

The changed pattern in exposure trend among the youngest age group is most likely the result largely of the impetus provided by the GLS. The overall change in the exposure of the comparison group over the full thirteen year period was an increase of only 3.5% while the corresponding increase in exposure for drivers aged 21 to 23 years was greater at 6.1%. Any differential changes in exposure across the three driver groups unrelated to the impact of the GLS are likely to be very small when compared with the very substantial relative changes in crash involvements. Accordingly, it is unlikely that changes in exposure patterns (as measured in driver-days) independent of the effects resulting from the GLS and its preceding measures have had an appreciable influence on the trends in absolute numbers of driver involvements over time.

As shown in Table 17, the greater percentage reductions recorded for young drivers relative to the comparison group equate to estimated savings in crash involvement numbers per

²² The crash involvement rate for a driver group was defined as the number of crash involvements for the group multiplied by 3,652,500 (the number of days in 10,000 years) and divided by the total number of driver-days of exposure for the group – i.e. the number of crash involvements per 10,000 driver-years of exposure.

annum (averaged over the three financial years 2011/12 to 2013/14) (Table 19). These savings were calculated by applying the percentage reduction in comparison group involvements between pre and post-GLS to the number of involvements by young drivers in the pre-GLS period. The result represents the saving in young driver crash involvements between pre and post-GLS had their percent reduction been the same as that for the comparison group. The difference between the observed crash reduction for young drivers and the reduction expected on the basis of the change for the comparison group represents the additional savings achieved by the enhanced GLS and related measures.

Table 19: Estimated savings per annum in crash involvements by crash severity and driver age relative to reductions in comparison group

Type of casualty crash	Age at involvement	Estimated savings per annum
Casualty crash involvements	Age 18–20 years	534 (82%)
	Age 21–23 years	118 (18%)
	Age 18–23 years	651 (100%)
FSI crash involvements	Age 18–20 years	128 (82%)
	Age 21–23 years	28 (18%)
	Age 18–23 years	156 (100%)

Table 19 shows that the great majority of savings to all young drivers were in the age group 18 to 20 years (over 80%), the group subject to all the provisions of the GLS. It is important to note that these savings are over and above the common savings arising from external factors experienced by both young drivers as well as by drivers within the comparison group age range over the thirteen year period.

Crash trends over time

Analysis approach

In order to examine the trends in crash involvement rates of young drivers over time, crash involvement rates over 13 financial years were plotted for licensed drivers by individual year of age at involvement within the age range 18 to 23 years with the comparison group aged 35 to 42 years.

Results

Figure 32 shows the casualty crash involvement rate (per 10,000 driver years) of drivers aged 18 to 23 years (by individual year of age) and the comparison group (aged 35 to 42 years) for each financial year 2001/02 to 2013/14.

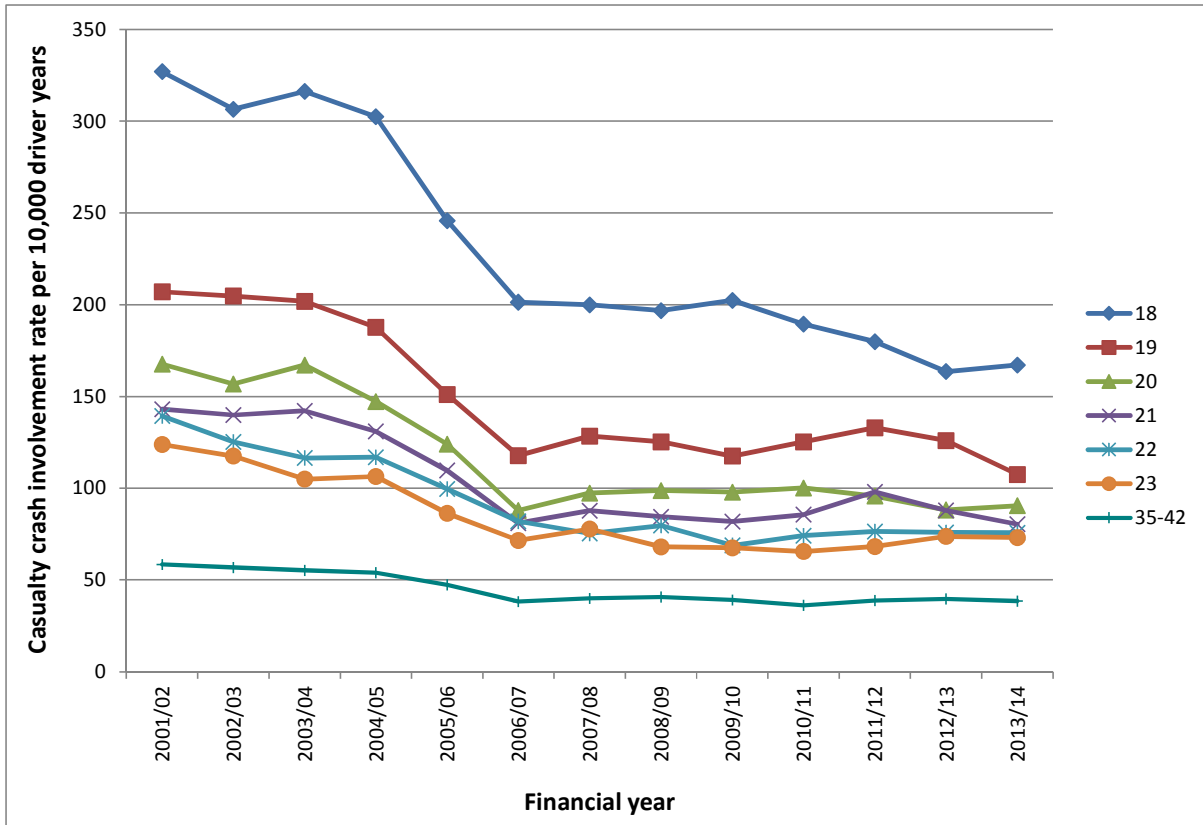


Figure 32: Casualty crash involvement rate per 10,000 driver-years by driver age

Figure 32 illustrates that the crash rate is highest in each year for 18 year olds and, with few exceptions, decreases with increasing age of drivers. In all cases, the involvement rate is lowest for the comparison group. In general terms, involvement rates have reduced over the 13 years for all driver ages with the reductions most pronounced in the period 2004/05 through to 2006/07.

Figure 33 shows the ratio of the crash involvement rates for each single year of age to the rate for the comparison group. The ratio for each novice age level falls during the study period, indicating that the decrease in crash involvement rate is proportionally greater for novices than for the comparison group, the largest decrease being for novices aged 18 years.

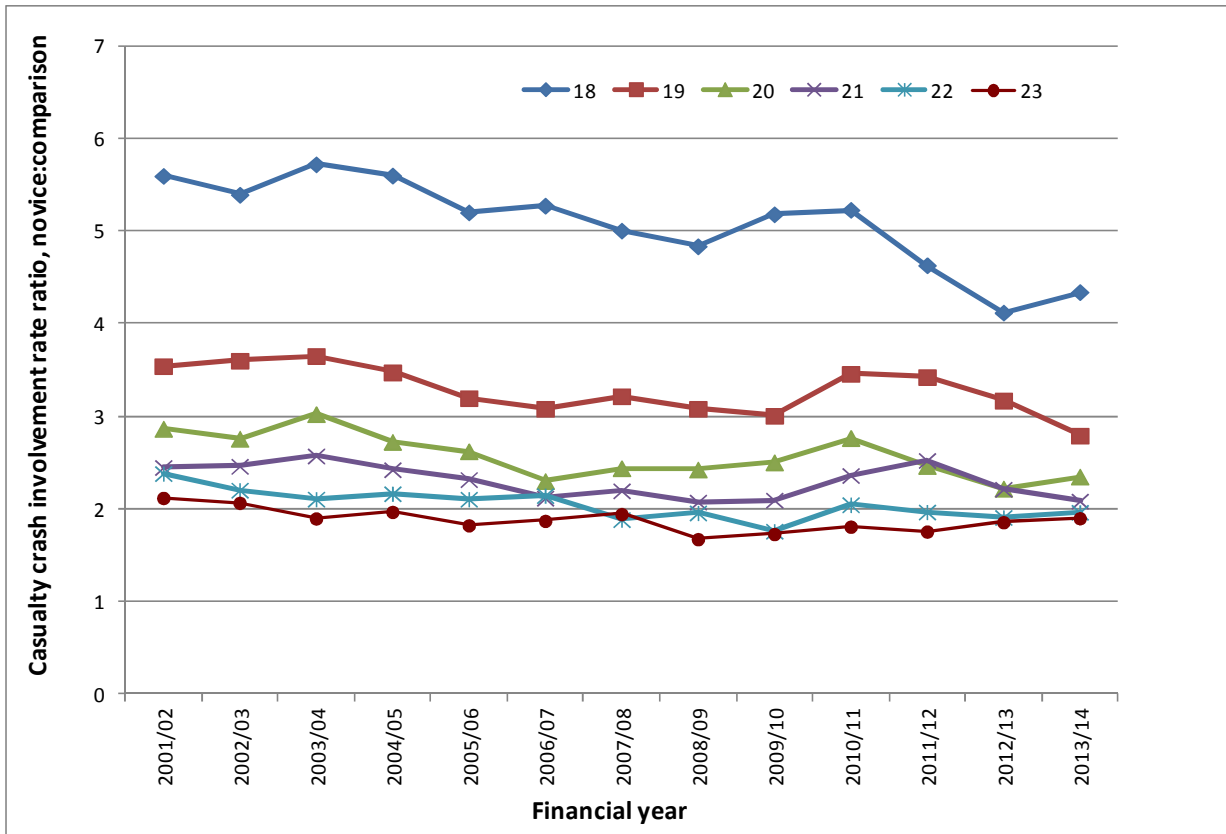


Figure 33: Ratio of novice to comparison group casualty crash involvement rates per 10,000 driver-years by age of novice driver

The equivalent rates over the thirteen financial years for involvements in crashes involving death or serious injury are shown in Figure 34. Once again, the rate is highest in each year for drivers aged 18 years and decreases with increasing age of driver, the lowest rate being for the comparison group aged 35 to 42 years. Similar to the trends observed for the casualty crash involvement rates, the rates reduce over the study period for each age group. Unlike casualty crash involvement rates, however, the decrease in FSI involvement rates is no steeper from 2004/05 to 2006/07 than at other times.

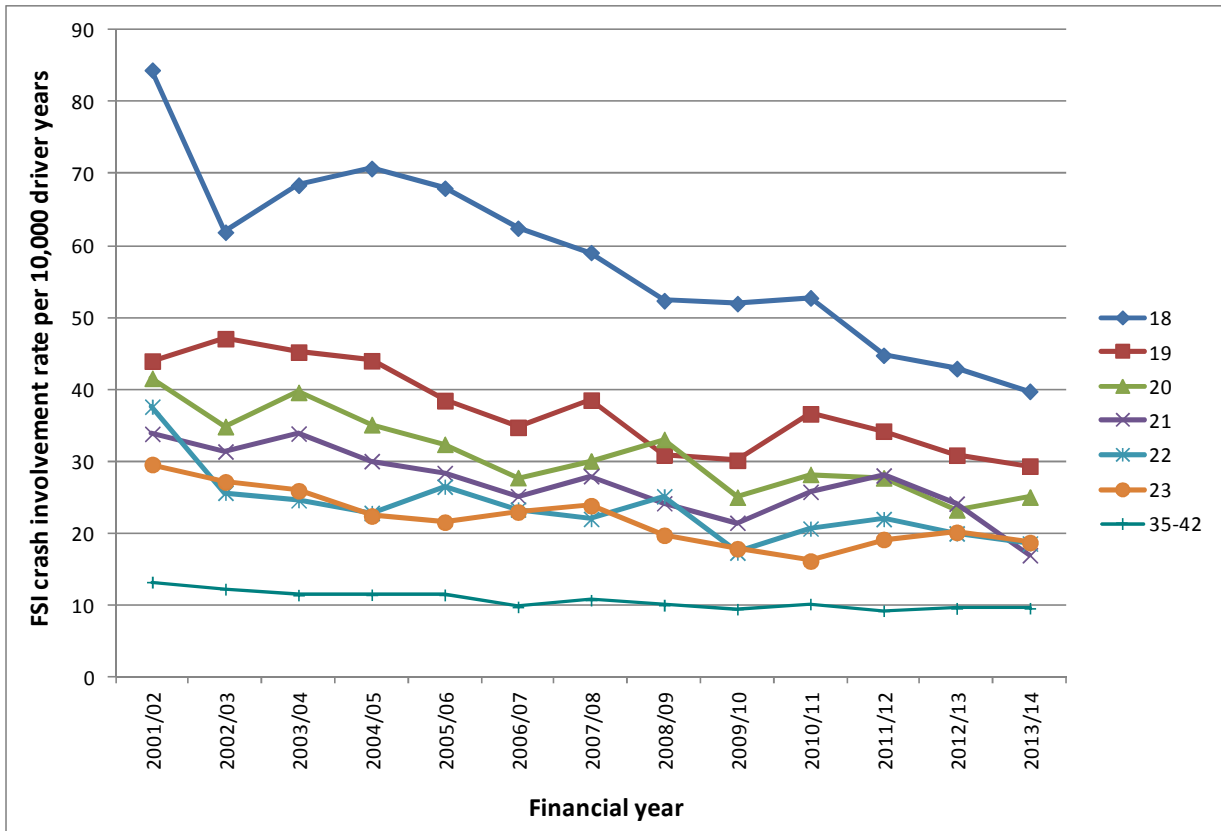


Figure 34: Fatal and serious injury crash involvement rate per 10,000 driver-years by driver age

The ratio of the death and serious injury crash involvement rates for each novice age level to the rate for the comparison group is shown in Figure 35. The ratio decreases substantially for 18 year olds and marginally for the other novice ages during the study period, indicating that the rate decreases for novices are proportionally greater than the rate decrease for the comparison group.

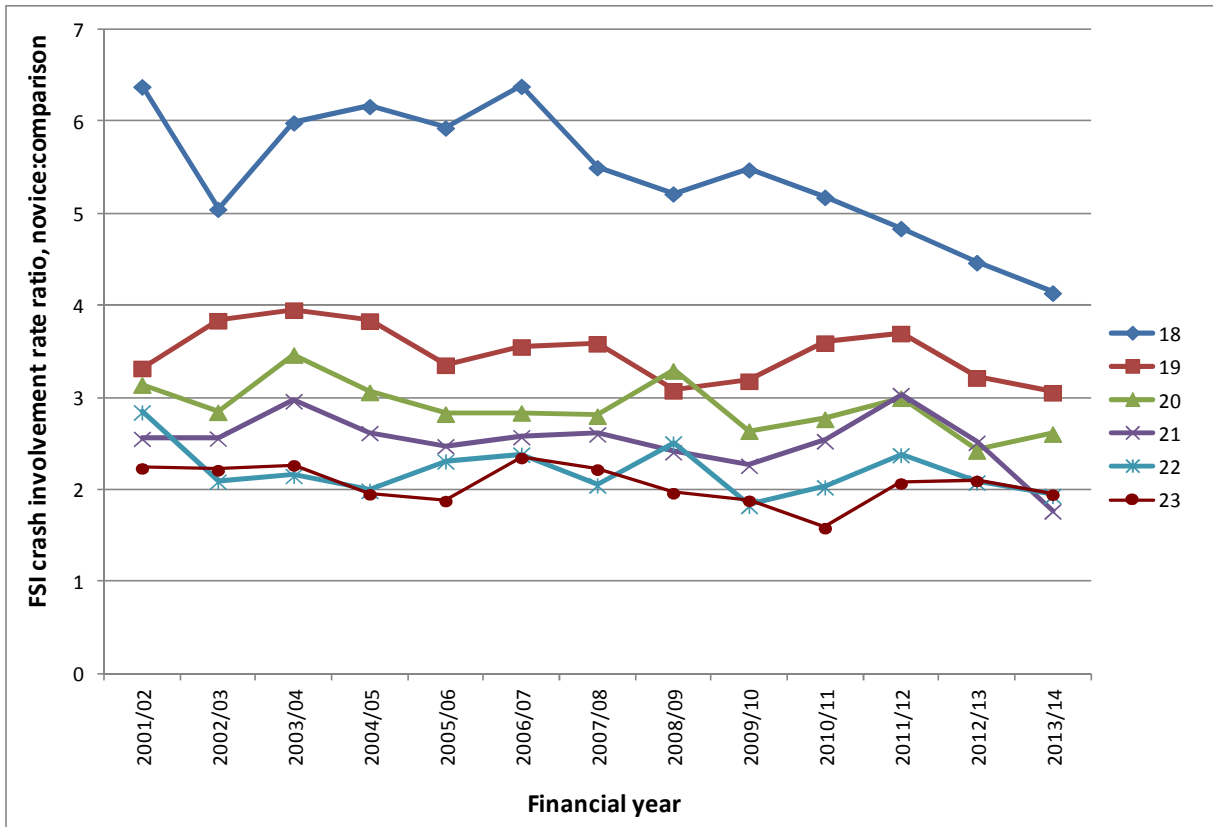


Figure 35: Ratio of novice to comparison group fatal and serious injury crash involvement rates per 10,000 driver-years by age of novice driver

Appendix E – Age at crash involvement time series, provides the figures for crash involvement rates by financial year by age at crash, with exposure and crash involvement rates.

Key findings summary

In terms of absolute numbers of crash involvements (no statistical testing):

- Decreases in casualty crash and fatal and serious injury (FSI) crash involvements over the 13 year study period (from 2001/02 to 2003/04 [pre-GLS] to 2011/12 to 2013/14 [post-GLS]) were substantially greater for drivers aged 18 to 23 years (42.5% decrease) than for the comparison group aged 35 to 42 years (29% decrease).
- Reductions were more marked for drivers aged 18 to 20 (48% decrease) than for those aged 21 to 23 years at crash involvement (34.8% decrease).
- Reductions resulted in estimated savings per annum for drivers aged 18 to 20 years of 534 casualty crash involvements (82% of the total saving for the 18 to 23 year olds), which included 128 FSI crash involvements (82% of the total saving for the 18 to 23 year olds) relative to the comparison group.
- Reductions resulted in estimated savings per annum for drivers aged 21 to 23 years of 118 casualty crash involvements (18% of the total saving for the 18 to 23 year olds),

which included 28 FSI crash involvements (18% of the total saving for the 18 to 23 year olds) relative to the comparison group.

In terms of rates of crash involvement per 10,000 driver-years:

- Casualty crash involvement rates for novice drivers for each year of age, 18 to 23, reduced over the thirteen year study period relative to a lower decrease over time for rate of involvement of the comparison group (35 to 42 years).
- Fatal and serious injury involvement rates decreased substantially for 18 year olds and marginally for the other novice ages relative to a smaller decrease for the comparison group.

Discussion

The Safe System approach adopted by the Victorian Government in developing its road safety strategy and action plan (Victoria State Government 2016) under the banner 'Towards Zero' recognises the need to reduce the absolute numbers of deaths and serious injuries occurring on Victoria's roads. Accordingly, the reduced number of young drivers involved in casualty and FSI crashes relative to the comparison group across the study period is a very positive outcome. While acknowledging that differences between exposure between novice and comparison groups may have had a modest impact on crash involvement counts (especially if young licensed drivers have travelled relatively less over the period of analysis compared with their older counterparts), the reduction reflects well on the collective impact on young driver safety of the GLS together with the series of measures that preceded it. These measures highlighted the elevated risk of young drivers and promoted extended supervised practice (both through mass advertising and community engagement).

In addition, crash involvement rates showed a generally decreasing trend, with occasional fluctuations, across the study period not only for the novice driver groups but also for the more experienced comparison group. The particularly rapid decreases from 2004/05 to 2006/07 for casualty crash involvements only, for both the novice groups and the comparison group, most likely reflect the substantial change in crash reporting rates that accompanied the introduction of a new Victoria Police electronic crash recording system (Traffic Incident System) on 1 January 2006.

Calculation of the ratio of crash involvements for the young driver groups to the comparison groups allowed the impact of external factors that affect both groups (e.g. road improvements, enforcement activity) to be cancelled out. As a result, changes in the ratio better reflect how young driver safety changed over time relative to the comparison group. Over the study period, the decreases in the ratio indicate that casualty and FSI crash involvement rates dropped more rapidly (in proportional terms) for young drivers than for

drivers in the comparison group. Inspection of the trends suggests that the rate ratios fell quite markedly in the later years of the study period, especially for drivers aged 18 years at licence issue.

As noted in the chapter on Learner Permit and Licensing Trends, there is evidence that introduction of the GLS has resulted in some migration of first licence acquisition from 18 years to later years, and especially to age 21 years and older. This migration means that it takes some years before a new ‘equilibrium’ in the profile across licence ages is attained. Accordingly, the specific impact of the GLS on young driver crash involvements, to be addressed in later sections of the chapter, will move beyond this transitional phase, where age of first licence uptake was changing, before assessing the full impact of the GLS upon young driver safety.

Age at crash involvement: before and after comparison

Aims

This section aims to answer:

- How has the GLS affected the crash involvement rates of young drivers whose age at crash involvement was 18–20 years, 21–23 years and 18–23 years?
- Are there differences in the effect of the GLS on crash involvement rates of young drivers based on age at time of crash involvement by (a) gender and (b) region of Victoria?

Analysis approach

In simple terms, the analysis approach is represented by the following 2 by 2 table.

Table 20: Analysis approach

Driver Group	Pre-GLS 2004/05–2006/07	Post-GLS 2011/12–2013/14
Novice driver group	(rate)	(rate)
Comparison group	(rate)	(rate)

Casualty crash and FSI crash involvement rates were compared post-GLS to pre-GLS for the young driver group relative to a comparison group, while taking account of the simultaneous impact of gender, crash location (metro/country) and age at crash involvement (18–20/21–23/18–23 years). The design of the analysis was:

Pre-GLS period:	2004/05 ²³ to 2006/07 (3 years)
Post-GLS period:	2011/12 to 2013/14 (3 years)
Novice drivers:	First licence issued at age 18 to 23 years and during the pre-GLS or post-GLS period Pre-GLS – learner permit issued no earlier than 1 July 2000 and licence issued no earlier than 1 July 2002 Post-GLS – learner permit issued no earlier than 1 July 2007 and licence issued no earlier than 1 July 2009
Comparison group:	Licensed drivers aged 35 to 42 ²⁴ years during the study periods with first licence issued at age 18 to 23 years
Independent variables:	Gender, crash location, age at involvement (18–20/21–23/18–23)

Limits were imposed on the permit and licence issue dates in the post-GLS young driver group to ensure that those drivers aged 18 to 20 years at licence were subject to the full provisions of the GLS. Corresponding limitations were placed on the pre-GLS group to ensure comparability. As a result of these limitations, older probationary drivers were under-represented in both novice driver groups by comparison with the driving population.

Results

Table 21 and Table 22 show the rates of involvement of novice and comparison group drivers in casualty crashes and FSI crashes respectively for the pre-GLS and post-GLS periods.

Table 21: Casualty crash involvement rate per 10,000 driver-years by age at crash

Driver group	Age at crash	Pre-GLS	Post-GLS	Change
Novice	18–20	161.9	116.9	–27.8%
	21–23	95.4	83.9	–12.0%
	18–23	141.0	106.0	–24.8%
Comparison	35–42	46.1	38.4	–16.7%

²³ Note that the 'before' period needed to commence after 1 December 2003 when the '5 demerit points over 12 months incurs a suspension' law was introduced for probationary drivers in Victoria. This law results in the driver being issued an option notice to take a suspension or a good behaviour bond (to drive for 12 months without a demerit point infringement).

²⁴ Note that an age of 42 years was chosen as the upper limit of the comparison group as accurate data for 'age at licence issue' were not available for those aged 43 years during the whole of the pre-GLS period.

Table 22: FSI crash involvement rate per 10,000 driver-years by age at crash










Driver group	Age at crash	Pre-GLS	Post-GLS	Change
Novice	18–20	42.6	29.7	–30.3%
	21–23	26.2	20.4	–22.0%
	18–23	37.4	26.6	–28.9%
Comparison	35–42	10.8	9.4	–13.1%

The tables show that crash involvement rates for both severity levels decreased from pre-GLS to post-GLS for both novice driver and comparison driver groups. Importantly, the reductions for young drivers aged 18 to 20 years were larger than those for the comparison group. Table 46 to Table 49 in Appendix F – Age at crash involvement by gender/ region provide additional breakdowns of crash involvement rates by gender and by crash location, together with crash involvement counts and exposure measures.

The statistical modelling analysis presents results that compare the crash involvement rates of each novice driver age group (18–20 and 21–23 years) with the comparison group (aged 35 to 42 years). All models took into account crash involvement rate variations between genders (male and female) and between crash locations²⁵. Results are summarised in Table 23 for casualty crash involvement rates of drivers aged 18 to 20 years at crash involvement and in Table 24 for those aged 21 to 23 years.

²⁵ It should be noted that the rates for metropolitan and country drivers were based on those for all Victorian drivers given that metropolitan drivers contribute to country crashes and vice versa.










Table 23: Modelling results for casualty crash involvement rates of drivers aged 18 to 20 years at crash involvement

Driver group (18–20 years)	Percent change	Significance*
Overall	13.6% 	HS
Male	14.0% 	HS
Female	13.3% 	S
Metro	16.6% 	HS
Country	4.0% 	NS
Metro - male	15.6% 	S
Metro - female	17.8% 	S
Country - male	8.5% 	NS
Country - female	0.6% 	NS

* HS – highly significant, $p < 0.0005$, S – significant, $p < 0.05$

NS – not significant

Table 24: Modelling results for casualty crash involvement rates of drivers aged 21 to 23 years at crash involvement










Driver group (21–23 years)	Percent change	Significance*
Overall	5.1% 	NS
Male	3% 	NS
Female	14.3% 	S
Metro	2.9% 	NS
Country	13.3% 	NS
Metro - male	3.5% 	NS
Metro - female	10.0% 	NS
Country - male	1.1% 	NS
Country - female	30.0% 	S

* Significant, $p < 0.05$, NS – not significant

The results presented above for casualty crash involvement rates point to an overall very positive 13.6% reduction among drivers aged 18 to 20 years at crash involvement who are subject to all the provisions of the enhanced GLS. Reductions were apparent for males and females overall as well as drivers in metropolitan areas (ranging from 14% to 17.8%). There

was no evidence, however, of a significant change in involvement rates in country areas. For drivers aged 21 to 23 years at crash involvement, significant increases were recorded for females overall (14.3%) and for females in country Victoria (30%).

Table 25: Modelling results for FSI crash involvement rates of drivers aged 18 to 20 years at crash involvement










Driver group (18–20 years)	Percent change	Significance*
Overall	20.3% 	HS
Male	18.4% 	S
Female	23.3% 	S
Metro	17.0% 	S
Country	27.5% 	S
Metro - male	15.3% 	NS
Metro - female	19.8% 	S
Country - male	25.9% 	S
Country - female	30.1% 	S

* HS – highly significant, $p < 0.0005$, S – significant, $p < 0.05$,
NS – not significant

For drivers involved in FSI crashes the corresponding results are summarised in Table 25 and Table 26. The results for involvements of drivers aged 18 to 20 years in FSI crashes show significant reductions across all categories (ranging from 15.3% to 30.1%) with the exception of males in the metropolitan area, for whom the reduction approached significance.

Results for drivers aged 21 to 23 years were less consistent across categories with significant reductions recorded for males (23.4%), males in the metropolitan area (24.4%) and the metropolitan area overall (14.7%). As for casualty crash involvements, there was no significant difference recorded for the overall FSI crash involvement rate of drivers aged 21 to 23 years in country areas.

Table 26: Modelling results for FSI crash involvement rates of drivers aged 21 to 23 years at crash involvement

Driver group (21–23 years)	Percent change	Significance*
Overall	11.0% 	NS
Male	23.4% 	S
Female	6.9% 	NS
Metro	14.7% 	NS
Country	3.2% 	NS
Metro - male	24.4% 	S
Metro - female	1.6% 	NS
Country - male	20.4% 	NS
Country - female	46.1% 	NS

* S – significant, $p < 0.05$, NS – not significant

Key findings summary

The key findings regarding age at crash involvement were²⁶:

- For drivers aged 18 to 20 years, the group with the highest rates of involvement, their casualty crash involvement rate reduced overall by a significant 13.6% and their FSI involvement rate by a significant 20.3%.
- Casualty crash reductions were apparent for both males (14%) and females (13.3%) aged 18 to 20 years and in metropolitan areas (16.6%).
- FSI crash reductions were apparent for both males (18.4%) and females (23.3%) aged 18 to 20 years, in metropolitan areas (17%) and country areas (27.5%).
- For drivers overall aged 21 to 23 years, there were no significant changes in their overall casualty and FSI crash involvement rates.
- For female drivers aged 21 to 23 years, their casualty crash involvement rate increased by a significant 14.3%, with the increase especially evident in country Victoria (30%) for these females.
- For male drivers aged 21 to 23 years, their FSI involvement rate decreased by 23.4% overall and by 24.4% in the metropolitan area.

²⁶ Note: restrictions on driver membership of the pre-GLS and post-GLS study periods led to a relatively small under-representation of 20 year olds in the 18–20 age group. In the 21–23 age group, 23 year olds are under-represented relative to 22 year olds, who are in turn under-represented relative to 21 year olds.

Discussion

The analysis showed, that after accounting for the combined influences of gender and region, the casualty crash involvement rate and the FSI crash involvement rate for drivers aged 18 to 20 years at crash reduced by 13.6% and 20.3% overall relative to the comparison group. These results are very positive as it is members of this group who are subject to all the provisions of the GLS and typically experience higher crash rates than their counterparts who are older, more experienced or both. Moreover, the reductions were typically greater for involvement rates in the more severe types of crashes - those that resulted in death, serious injury or both. Favourable, and in most cases significant, results applied to both males and females as well as across Metropolitan Melbourne and Country Victoria.

Drivers aged 21 to 23 years at crash involvement, however, are a group of drivers who represent a mix - those who were subject to all the provisions of the GLS once introduced as well as those who applied for their licence at age 21 years or older and so were only required to undertake the three-year P2 stage of the probationary period and not complete a minimum 120 hours of practice. The results indicate that the only significant changes in relation to casualty crash involvement rates were increases among females and females in country areas. When the focus turns to serious crash involvements, a different picture emerged. Significant reductions in rates of involvement applied to male drivers and to males in the metropolitan area. The reasons underpinning the disparate trends in crash involvement rates for male and female drivers aged 21 to 23 years at crash are unclear and warrant further investigation. It is worth noting though that crash involvements were considerably greater for drivers aged 18 to 20 years, for whom significant reductions applied, than for drivers aged 21 to 23 years.

The pre-GLS and post-GLS periods as well as the respective dates after which learner permits and licences could be taken out were chosen to better assess the impact of the GLS upon crash involvement rates. The immediate disruptive effects to licensing rates pre- and post-GLS were avoided, as was the period post-GLS, as age at licence profiles were shifting towards a new 'steady state'. Accordingly, it is highly likely that the GLS itself has been influential in reducing overall crash involvement rates among young drivers aged 18 to 20 years at involvement. The impact has been more marked for the more severe types of crash. Finally, it should be noted that as a result of the design restrictions of the crash study (years chosen for the pre- and post-GLS periods to avoid the disruptive licensing trends changes), older drivers within the age range 18 to 20 and 21 to 23 years were under-represented in the chosen cohort (more 18 and 19 year olds than 20 year olds, for example). Over time, the study design restrictions will no longer be required and a proper balance ('steady state')

across driver licensing ages will be restored. At that time, a higher relative proportion of older drivers in each chosen group should serve to moderate slightly the overall impact of the GLS found in this analysis. Currently, however, the results derived accurately reflect the benefits that accompanied the enhanced GLS during the defined study period.

Time since first licence issue (experience): before and after comparison

Aims

This section aims to answer:

- How has the GLS affected the crash involvement rates of young drivers whose age at licence issue was 18–20 years or 21–23 years by different ‘experience’ levels (first, second, third or fourth year post first licence issue)?
- Are there differences in the effect of the GLS on crash involvement rates of young drivers of different experience and ‘age at licence’ levels by (a) gender and (b) region of Victoria?

Analysis approach

Casualty crash and FSI crash involvement rates were compared post-GLS to pre-GLS for the novice driver group relative to the comparison group, while taking account of the simultaneous impact of gender, crash location (metro/country), age at licence issue and time since licence issue. The design of the analysis was:

Pre-GLS period: 2004/05 to 2006/07 (3 years)

Post-GLS period: 2011/12 to 2013/14 (3 years)

Novice drivers: Drivers aged 18 to 23 years at licence and within their first four years after licence issue during the study periods²⁷

Pre-GLS – learner permit issued no earlier than 1 July 2000 and licence issued no earlier than 1 July 2002

Post-GLS – learner permit issued no earlier than 1 July 2007 and licence issued no earlier than 1 July 2009

²⁷ These drivers were aged 18 to 27 at crash involvement.

Comparison group: Licensed drivers whose first car licence was issued at age 18 to 23 years, within 12 to 18²⁸ years after licence issue during the pre-GLS or post-GLS period

Independent variables: Gender, crash location, age at licence issue (18–20/21–23 years) and completed years from first licence issue (0/1/2/3)

In order to assess the impact of the GLS on young drivers subject to all provisions of the GLS across their first four years of driving experience, it was necessary to apply restrictions on the selection of study samples. This resulted in more experienced drivers being under-represented relative to less experienced drivers in both young driver groups when compared with Victoria’s driver population.

Results

Observed changes in crash involvement rate

Rates of involvement of novice drivers and comparison group drivers in casualty crashes are shown in Table 27 below with the corresponding rates for involvements in FSI crashes shown in Table 28.

Table 27: Casualty crash involvement rate per 10,000 driver-years by licence issue age by years since licence issue

Licence issue age	Driver group	Years since licence issue	Pre-GLS rate	Post-GLS rate	Change
18 to 20	Young driver	0	218.2	143.1	-34.4%
		1	130.9	104.5	-20.2%
		2	102.4	81.0	-20.9%
		3	78.7	74.2	-5.7%
		All	143.5	107.6	-25.0%
Comparison		12–18	49.3	39.5	-19.8%
21 to 23	Young driver	0	151.7	105.7	-30.3%
		1	114.2	92.8	-18.7%
		2	95.0	90.7	-4.5%
		3	63.9	68.6	7.4%
		All	117.7	96.0	-18.4%
Comparison		12–18	55.7	44.4	-20.3%
18 to 23	Young driver	0	213.4	138.5	-35.1%
		1	129.8	103.3	-20.4%
		2	102.0	81.7	-19.9%
		3	77.9	73.9	-5.2%

²⁸ The experience range for the comparison group was chosen to maximise the sample size for analysis purposes, while ensuring that overlap between pre-GLS and post-GLS cohorts remained under 50%.

Licence issue age	Driver group	Years since licence issue	Pre-GLS rate	Post-GLS rate	Change
		All	141.8	106.4	-25.0%
	Comparison	12-18	49.7	39.9	-19.7%

Table 28:FSI crash involvement rate per 10,000 driver-years by licence issue age by years since licence issue

Licence issue age	Driver group	Years since licence issue	Pre-GLS rate	Post-GLS rate	Change
18 to 20	Young driver	0	58.1	36.1	-37.9%
		1	33.4	26.3	-21.2%
		2	27.5	19.5	-29.2%
		3	23.0	19.1	-16.7%
		All	38.1	26.9	-29.3%
Comparison		12-18	12.2	9.6	-21.4%
21 to 23	Young driver	0	34.4	29.2	-15.1%
		1	33.8	24.7	-27.0%
		2	28.3	20.8	-26.5%
		3	34.4	12.3	-64.4%
		All	32.9	24.9	-24.3%
Comparison		12-18	12.8	9.5	-25.8%
18 to 23	Young driver	0	56.4	35.3	-37.5%
		1	33.4	26.1	-21.8%
		2	27.6	19.6	-28.9%
		3	23.6	18.7	-20.6%
		All	37.8	26.7	-29.2%
Comparison		12-18	12.3	9.6	-21.8%

The tables show that crash involvement rates for both crash severity levels generally decreased from the pre-GLS period to the post-GLS period for both novice driver groups and for the comparison group, with reductions especially marked for young drivers aged 18 to 20 years at licence in their first year under the GLS. The tables also highlight the reducing rates of crash involvement as drivers acquired more experience with those in their fourth year of driving having crash involvement rates approximately one half those of drivers in their first year of driving.















Statistical analysis results

Models were fitted both to casualty crash involvement rates and to fatal and serious injury crash involvement rates, where each model compared novice driver experience levels (first, second, third or fourth year since licence issue) with the comparison group. Additional models were fitted in which each young driver experience level was broken down by gender,

region and licence issue age, separately and together. This section summarises only key results, with further breakdowns in Appendix G – Time since first licence issue (experience) additional results.

Table 29 summarises the statistical significance of changes in young driver crash involvement rates in their first year of driving with further breakdown by gender, age at licence and region.

Table 29: Statistically significant results for modelling of crash involvement rates of young drivers (18–23 years) in their first year of driving

Crash type and experience	Driver group (0 to <1 year)	Change		Significance*
Drivers with 0 to <1 years of experience involved in casualty crashes	Overall	18.7%		S
	Male	18.1%		S
	Female	19.5%		S
	Licensed at 18–20 years	19.2%		S
	Licensed at 21–23 years	13.2%		NS
	Metropolitan crashes	18.9%		S
	Country crashes	17.5%		S
Drivers with 0 to <1 years of experience involved in fatal and FSI crashes	Overall	19.4%		S
	Male	20.6%		S
	Female	18.3%		NS
	Licensed at 18–20 years	21.7%		S
	Licensed at 21–23 years	17.4%		NS
	Metropolitan crashes	15.1%		S
	Country crashes	29.0%		S

* S – significant, p<0.05, NS – not significant








Importantly, the percentage changes shown in the table represent estimates of changes in crash involvement rates that are most likely attributable to the GLS, after taking the influence of other external factors into account.

Table 29 shows that changes in casualty and FSI crash involvement rates for first year drivers overall and by gender and region were very favourable. Results were stronger for drivers aged 18 to 20 years at licence with drivers licensed at ages 21 to 23 years not registering a significant change in crash involvement rates. It should be noted that there are significantly fewer drivers aged 21 to 23 years than those aged 18 to 20 years at licence. Their involvements in casualty and FSI crashes are correspondingly fewer.

The statistical analysis did not detect any significant changes in novice driver crash involvement rates relative to the comparison group for those in their second or third year of driving, nor for those involved in FSI crashes in their fourth year of driving. As a result, only

findings for those drivers involved in casualty crashes in their fourth year since licence are presented in Table 30.

Table 30: Statistically significant results for modelling of casualty crash involvement rates of young drivers (licensed at 18–23 years) in their fourth year of driving

Crash type and experience	Driver Group (3 to <4 year)	Percent change		Significance*
Drivers with 3 to <4 years of experience involved in casualty crashes only	Overall	18.2%		S
	Male	9.9%		NS
	Female	28.3%		S
	Licensed at 18–20 years	17.1%		S
	Licensed at 21–23 years	35.8%		NS
	Metropolitan crashes	22.7%		S
	Country crashes	4.7%		NS

* S – significant, p<0.05, NS – not significant

Table 30 shows that casualty crash involvement rates for drivers in their fourth year of driving increased overall by 18.2%; increases were also statistically significant for drivers licensed at 18 to 20 years (17.1%), metropolitan crashes (22.7%) and females (28.3%). The relative increase in involvement rates for females was confined to crashes in country areas while the increase in involvements in metropolitan crashes was attributable to both males (significant) and females aged 18 to 20 years at licence (approaching significance). Refer to results contained in Appendix G – Time since first licence issue (experience) additional results.

Long-term crash involvement reductions for combined young driver experience levels

As study periods and restrictions on driver membership have resulted in an under-representation of drivers who have held their licences for longer periods, an estimate of the expected impact of the GLS on a driving population with equal representations across all four experience levels has been calculated. Based on these calculations, it is estimated that when drivers across all four experience levels were combined and aged 18 to 23 years at licence, there is a 5.1% reduction in casualty crash involvement rate and a 9.3% reduction in fatal and serious injury crash involvement rate. The equivalent figures for drivers aged 18 to 20 years at licence are a 5.9% and 9.8% reduction respectively.

Key findings summary

The following crash involvement changes were observed:

- For drivers aged 18 to 23 years at licence issue within each of their experience levels (less than 1, 2, 3 or 4 years driving) as well as for the comparison group, casualty crash and FSI crash involvements reduced between the pre-GLS and post-GLS periods.
- Crash involvement rates dropped with each additional year of driving experience, resulting in lower crash rates for more experienced drivers.
- The overall reduction in casualty and FSI crash involvement rates following the enhancement of the GLS was most marked for drivers aged 18 to 20 years at licence issue in their first year of driving compared with other age groups and other experience levels.

The statistical testing led to the following conclusions:

- Casualty and FSI crash involvement rates of drivers aged 18 to 23 years at licence in their first year of driving dropped by 18.7% and 19.4%, respectively, following the enhancement of the GLS.
- Reductions in casualty and FSI crash rates for drivers aged 18 to 23 years in their first year of driving applied across both metropolitan (18.9% and 17.5% respectively for casualty crashes) and country areas (15.1% and 29% respectively for FSI crashes).
- There were crash involvement rate reductions for male drivers (18.1% for casualty crashes and 20.6% for FSI crashes); the rate drop for female drivers was significant for involvements in casualty crashes only (19.5%).
- Reductions were significant for drivers aged 18 to 20 years in their first year of driving (19.2% for casualty crashes and 21.7% for FSI crashes), but not for drivers aged 21 to 23 years.
- There were no equivalent drops for drivers aged 18 to 20 years at licence in their second or third year of driving.
- Casualty crash involvement rates for drivers aged 18 to 23 years at licence in their fourth year of driving increased by 18.2% overall with significant increases noted for drivers licensed at 18 to 20 years, female drivers and crash involvements in the metropolitan area.
- By adjusting for the under-representation of more experienced drivers in the study sample, it was estimated that in the longer term drivers aged 18 to 23 years at licence issue and in their first four years of driving would experience a 5.1% and a 9.3% reduction in casualty and FSI crash involvement rates respectively. The equivalent figures for those aged 18 to 20 years at licence issue were estimated to be reductions of 5.9% and 9.8% respectively.

Discussion

The analysis undertaken points to a very substantial and statistically significant reduction in both casualty crash and FSI crash involvement rates, 18.7% and 19.4% respectively, for drivers in their first year of driving aged 18 to 23 years at licensing. For this combined age group, reductions between the pre-GLS and post-GLS periods were apparent across both Metropolitan Melbourne and Country Victoria and for both males and females in casualty crash involvements, but males only in FSI crash involvements. The strongest influence of the GLS appeared to be among those licensed at ages 18 to 20 years – the group subject to all the P1 provisions of the enhanced GLS including passenger and mobile phone restrictions, the requirement to achieve at least 120 hours of practice as a learner and to pass the new, challenging Drive Test. Those licensed at ages 21 to 23 years, however, did not register a significant reduction in crash involvement rates for any level of experience.

In contrast to the highly favourable results for first year drivers, there were no significant crash involvement rate reductions for drivers in their second or third year of driving, and there was a significant increase in the casualty crash involvement rate (though not in the FSI rate) for fourth-year drivers. The increase was apparent in casualty crash involvements among drivers licensed in the age range 18 to 20 years, female drivers in country areas and crashes occurring within the Metropolitan Area.

With the safety gains experienced by first-year drivers not being sustained into years two and three, a potential interpretation is that novice driver behaviours gravitate over time to the general norms of traffic behaviour. As experience logged up as an independent driver increases, the direct impact of the additional practice hours may recede. The reasons why the safety gains were not sustained into years two and three of licensing warrant further research and investigation.

The increase in relative casualty crash involvement rates for drivers in their fourth year of driving, and especially for those aged 18 to 20 years at licence, cannot be explained in terms of the direct impact of the range of safety measures introduced as part of the enhanced GLS. Under the GLS, drivers in their fourth year remain within the P2 stage and so are subject to the provisions that apply. They are being compared with drivers pre-GLS, most of whom would have been in the first year of a full licence. It is worth noting that fourth year drivers post-GLS would have been licensed during the transitional phase following introduction of the GLS. As a result, the composition of this cohort may well differ from that of a cohort with similar driving experience but who were licensed once the transitional phase had concluded. Despite the crash involvement increases for fourth year drivers, it is

important to note that rates of involvement of fourth year drivers within the post-GLS period were far lower than the rates for less experienced drivers.

A further point to note is that many drivers had already achieved the minimum 120 hours as a result of a sustained program of promotion and encouragement in the years leading up to introduction of the GLS (Learner Driver Behaviour Chapter). As a result some of the safety gains that are attributable to the additional driving experience as a learner were achieved in advance of the GLS. This would have the effect of 'softening' the impact of the GLS itself upon driver crash involvement rates.

With a view to estimating the impact of the GLS on a future population of young drivers, the assumption was made for calculation purposes that there were equal numbers of young people across each of the experience levels. The calculation estimated that, for drivers in their first four years of driving and licensed in the age range 18 to 23 years, casualty crash involvement rates would reduce by 5.1% and FSI crash involvement rates by 9.3%. The equivalent figures for those aged 18 to 20 years at licence were estimated to be reductions of 5.9% and 9.8% respectively.

The GLS in all likelihood has been very influential in making first year drivers aged 18 to 20 years at licence who are subject to all the provisions of the P1/P2 stages of the enhanced GLS appreciably safer.

Alcohol involvement: before and after comparison

Aims

This section aims to determine how effective the GLS has been in reducing alcohol-related crash involvement rates among fourth year drivers who were licensed at 18 to 20 years.

Analysis approach

Under the enhanced GLS provisions, a probationary driver who is aged 18 to 20 years at licence is subject to a zero blood alcohol law for four years, compared with three years pre-GLS. The probationary period will be longer than four years if the driver commits an offence during the probationary period (either P1 or P2 stage) resulting in a licence suspension, including an alcohol or drug-related offence. The equivalent cohort pre-GLS in their fourth year of driving would mostly have graduated to a full licence and therefore subject to a blood alcohol limit of 0.05 g/100 ml. The analysis is intended to determine whether the GLS enhancements have led to a reduction in crash involvements while driving with a blood alcohol concentration greater than zero.

In the absence of sufficient blood alcohol data for drivers involved in casualty crashes to enable a worthwhile analysis, crash involvements were analysed during 'high alcohol hours' (HAH), those periods of the week when the proportion of crashes involving alcohol is much higher than for other times of the week (Gantzer 1995). A change in the number of casualty crashes during HAH is often considered to be indicative of a corresponding change in the number of crashes involving alcohol.

Both casualty and FSI crash involvement rates during HAH times were compared between the pre-GLS and post-GLS periods. Changes in crash rates for the young driver cohort were compared with the corresponding changes for a comparison group, members of which were not subject to the provisions of the enhanced GLS.

The design of the analysis was:

Pre-GLS:	2004/05 to 2005/06 (2 years ²⁹)
Post-GLS:	2012/13 to 2013/14 (2 years)
Novice drivers:	Drivers aged 18 to 20 years at licence within three to less than four years after licence issue during the pre-GLS and post-GLS study periods ³⁰ Pre-GLS – licence issued 2 July 2000 to 30 June 2003 Post-GLS – licence issued 2 July 2008 to 30 June 2011
Comparison group:	Licensed drivers whose first car licence was issued at age 18 to 20 years, within 14 to 18 years after licence issue during the pre-GLS or post-GLS period
Independent variables:	Gender, crash location, crash type (single vehicle/multi-vehicle/pedestrian involved)

Results

Observed changes in crash involvement rates

Rates of involvement of fourth year drivers and the comparison group in HAH crashes are shown in Table 31 for casualty crashes and in

Table 32 for FSI crashes. Both tables reveal substantial reductions in HAH crash

²⁹ Note that the pre-GLS period has been set back one year as a new penalty provision was introduced on 1 January 2007 for drivers under the age of 26 years convicted of a drink-drive offence with a BAC between 0.07 and 0.149 g/100 ml. In these cases, an alcohol interlock is required to be fitted for at least six months on re-licensing. This limited the period of analysis to two years as the period was also brought forward to ensure that it occurred after the introduction on 1 December 2003 of the '5 demerit points in 12 months' law for probationary drivers.

³⁰ These drivers were aged 21 to 24 years at crash involvement.

involvement rates for the young drivers as a whole, for the comparison group and for most sub-groups.

Table 31: High alcohol hour casualty crash involvement rate per 10,000 driver-years by licence issue age by gender: fourth-year drivers aged 18 to 20 years at licence and comparison group

Gender	Licence issue age	Involvement rate				Rate change	
		Novice		Comparison		Novice	Comparison
		Pre-GLS	Post-GLS	Pre-GLS	Post-GLS		
Female	18	46.7	29.8	15.1	10.9	-36.2%	-27.4%
	19	50.5	26.1	14.8	11.7	-48.3%	-21.1%
	20	24.7	41.4	12.9	8.1	+67.8%	-36.9%
	18-20	45.6	30.0	14.9	10.8	-34.2%	-27.1%
Male	18	65.3	34.1	25.0	14.5	-47.9%	-42.0%
	19	58.7	28.0	27.0	19.2	-52.4%	-28.8%
	20	72.8	38.0	32.4	13.2	-47.8%	-59.3%
	18-20	65.0	33.5	25.5	15.0	-48.5%	-41.2%
All	18	56.6	32.1	20.3	12.8	-43.3%	-37.2%
	19	54.1	27.0	19.2	14.9	-50.1%	-22.2%
	20	45.3	39.8	19.6	10.2	-12.1%	-48.0%
	18-20	55.6	31.8	20.1	12.9	-42.7%	-35.9%

Table 32: High alcohol hour fatal and serious injury crash involvement rate per 10,000 driver-years by licence issue age by gender: fourth-year drivers at 18 to 20 years at licence and comparison group

Gender	Licence issue age	Involvement rate				Rate change	
		Novice		Comparison		Novice	Comparison
		Pre-GLS	Post-GLS	Pre-GLS	Post-GLS		
Female	18	9.92	7.39	4.78	2.49	-25.6%	-47.9%
	19	8.42	4.36	5.31	2.70	-48.3%	-49.2%
	20	2.74	13.79	3.21	1.87	+403.3%	-41.8%
	18-20	9.17	7.33	4.76	2.47	-20.0%	-48.0%
Male	18	21.78	10.85	7.62	4.70	-50.2%	-38.3%
	19	14.23	8.23	7.16	5.61	-42.2%	-21.6%
	20	29.11	16.88	11.15	4.40	-42.0%	-60.6%
	18-20	21.35	10.81	7.71	4.79	-49.3%	-37.9%
All	18	16.23	9.25	6.30	3.64	-43.0%	-42.1%
	19	10.98	6.17	5.97	3.94	-43.8%	-33.9%
	20	14.07	15.18	5.96	2.92	+7.9%	-51.0%
	18-20	15.44	9.16	6.23	3.64	-40.7%	-41.6%

Additional breakdowns including crash involvement counts and exposure measures can be found in Appendix F of Catchpole et al. (2016) pp. 108–11.

Statistical analysis results

Models were fitted to both the casualty and FSI crash involvement data comparing overall novice driver and comparison groups during HAH times. Additional models were fitted in which both groups were further broken down by gender, crash location and by crash type (single-vehicle/other).

This section only provides summary results for the overall groups and for breakdowns by a single factor. Further details of these results (including significance and confidence intervals) can be found in Appendix F of Catchpole et al. (2016) pp. 112–9.

The overall change in the casualty crash involvement of the young driver group as a whole, relative to the comparison group during HAH, was a reduction of 9.4%, but this change was not statistically significant. For fatal and serious injury crash involvements, there was a small 2.8% increase during HAH, but again this did not approach significance.

Across all the analyses conducted, the only statistically significant result was a substantial 19.9% reduction in the rate of involvement of fourth year young drivers in metropolitan HAH casualty crashes after taking account of the influences of the other variables listed above. A reduction in their single-vehicle crash involvements was the main contributor to this drop and was partly offset by a corresponding increase in their crash involvements in country Victoria.

Key findings summary

Application of statistical analysis resulted in the following findings for drivers aged 18 to 20 years at licence in their fourth year of driving:

- The overall change in casualty crash involvement rate during HAH was a non-significant reduction of 9.4%.
- Casualty crash involvement rates during HAH reduced by a significant 19.9% in the metropolitan area, with the following two subgroups within metropolitan crashes also reducing significantly:
 - single-vehicle (40.7%)
 - males and single vehicle (51.2%).
- Small sample sizes coupled with the use of a proxy measure for crashes involving alcohol (HAHs) meant that the ability of the statistical testing to discern a significant change was very limited.

Discussion

The almost total lack of statistically significant results in this part of the study is likely to be attributable to small sample sizes as a result of:

- the limited study period windows of two years
- the focus on drivers within a single year of experience only
- the relatively low crash involvement rate of fourth year drivers compared with their less experienced counterparts
- examination of a subset of casualty crashes and of FSI crashes; those that occur during HAH hours only.

The use of a proxy measure (involvements in HAH crashes) in place of the measure of interest (involvement in crashes when affected by alcohol) also reduced the opportunity to detect reliable changes. The proxy while chosen for its availability, its sample size and its link to alcohol-related trauma also includes a large number of crashes that did not involve alcohol. All the above factors lead to a lack of statistical power in being able to detect reliable and valid changes in the crash involvement rates involving young drivers affected by alcohol. A review of the crash data indicates a proxy with the strongest link to alcohol-related trauma is single-vehicle crashes leading to death or serious injury. A significant reduction was found in the single-vehicle crash involvement rate in the metropolitan area.

The estimated change in the casualty crash involvement rate for novices, though not statistically significant, was a favourable 9.4% reduction, with a significant 19.9% reduction in Metropolitan Melbourne. While not an exact correspondence, some support for this finding is provided in the analysis of offence rates (Trends in Rates of Offending Chapter) for drivers aged 18 to 20 years at licence and aged 21 years at offence that showed a statistically significant relative reduction of 32.9% for alcohol-related offences. For drivers aged 22 years or more at offence, the equivalent result was a non-significant relative 19.3% offence rate reduction with sample sizes rendering the result inconclusive. The survey of probationary drivers also showed a halving of self-reported drink-driving among fourth year drivers post-GLS compared with pre-GLS.

Peer passengers: before and after comparison

Aims

This section aims to determine how effective the GLS was in reducing the rate of crash involvements with two or more peer passengers for first year P1 drivers.

Analysis approach

Both casualty and FSI crash involvement rates were compared between the pre-GLS and post-GLS periods for first year P1 drivers compared with the corresponding changes for the chosen comparison group. Analyses were performed using modelling for each peer occupancy category (see below) taking into account the effects of gender, region and age at licence.

The design of the analysis was:

Pre-GLS:	2004/05 ³¹ to 2006/07 (3 years)
Post-GLS:	2010/11 to 2013/14 (4 years) ³²
Novice drivers:	Drivers aged 18 to 20 years at licence within the first year after licence ³³ issue during the pre-GLS and post-GLS study periods
Comparison group:	Licensed drivers whose first car licence was issued at age 18 to 20 years, within 12 to 18 years after licence issue during the pre-GLS or post-GLS period
Independent variables:	Gender, crash location, age at licence issue (18/19–20), number of peer passengers (0/1/2+ with supervisor/2+ without supervisor)

For the purpose of the analysis, any front-seat passenger who was reported to be old enough to possibly hold a full licence was assumed to be a supervisor. It was not possible to determine whether the novice driver qualified for a peer passenger exemption (such as the peer passengers being siblings of the driver).

There was some overlap (less than 50%) between drivers belonging to the pre and post-GLS comparison groups. However, each day of exposure and each crash involvement fell within either the pre-GLS period or the post-GLS period, but not both. There were no other overlaps across groups.

³¹ Note that the 'before' period needed to commence after 1 December 2003 when the '5 demerit points in 12 months' law was introduced for probationary drivers.

³² The post-GLS period was extended back by one year given the small numbers expected within the 2+ category of passenger occupancy in order to build statistical power in the analysis.

³³ Drivers were aged 18 to 21 years at crash involvement.

Results

Crash involvement rates for the P1 young driver group and for the comparison group are shown in Table 33 (casualty) and Table 34 (FSI). In both tables, the P1 driver group is broken down by the number of peer passengers reported in the vehicle at the time of the crash.

Table 33: Casualty crash involvement rate by number of peer passengers

Driver group	Peer passengers	Involvement rate		Rate change
		Pre-GLS	Post-GLS	
P1 driver	0	147.0	107.3	-27.0%
	1	46.1	32.5	-29.4%
	2+ with supervisor	1.0	0.4	-64.4%
	2+ without supervisor	24.3	5.8	-76.3%
	Total	218.4	145.9	-33.2%
Comparison	N/A	49.3	39.3	-20.3%

The tables show that for both casualty and FSI crash involvements, crash rate reductions were evident across all categories and were, without exception, greater for all P1 driver peer passenger categories than for the comparison group. The reductions in involvement rates were especially marked for drivers with two or more peer passengers.

Table 34: Fatal and serious injury crash involvement rate by number of peer passengers

Driver group	Peer passengers	Involvement rate		Rate change
		Pre-GLS	Post-GLS	
P1 driver	0	34.4	24.7	-28.3%
	1	14.3	10.4	-27.1%
	2+ with supervisor	0.5	0.2	-69.5%
	2+ without supervisor	9.0	2.3	-74.4%
	Total	58.2	37.6	-35.5%
Comparison	N/A	12.2	9.8	-20.1%






















Further breakdowns by crash location and gender, including crash involvement counts and exposure measures can be found in Appendix G of Catchpole et al. (2016), pp 118–121.

Statistical analysis results

The category of ‘2+ passenger with supervisor’ was excluded from any further analysis as it comprised only 23 out of 6458 P1 driver crash involvements (0.36%). Similarly, the absence of entries in some cells meant that the analysis of FSI crash involvements did not include a breakdown of licence age into the separate categories of 18 years and 19–20 years.

The first set of analyses compared P1 drivers carrying each number of peer passengers (0/1/2+) with the comparison group. The results for casualty crash involvements are summarised below in Table 35 and FSI crash involvements are in Table 36. Analyses comparing rates of FSI involvement for P1 drivers with zero or one passenger were excluded from Table 36 as no comparison was found to be statistically significant. Additional details of these models, plus breakdowns by two and three factors can be found in Appendix G of Catchpole et al. (2016) pp 122–135.

Table 35: Statistically significant results comparing modelled casualty crash involvement rates of P1 drivers with comparison group

No. peer passengers	Driver group (0 to <1 year)	Percent change	Significance*
Drivers with 0 peer passengers	Overall	9.1% 	S
	Male	5.3% 	NS
	Female	13.3% 	S
	Licensed at 18 years	6.4% 	NS
	Licensed at 19–20 years	19.4% 	S
	Metropolitan crashes	9.9% 	S
	Country crashes	5.9% 	NS
Drivers with 1 peer passenger	Overall	12.0% 	S
	Male	5.4% 	NS
	Female	20.8% 	S
	Licensed at 18 years	10.9% 	NS
	Licensed at 19–20 years	16.8% 	NS
	Metropolitan crashes	15.3% 	S
	Country crashes	4.2% 	NS
Drivers with 2 or more peer passengers	Overall	69.8% 	S
	Male	70.4% 	S
	Female	67.7% 	S
	Licensed at 18 years	71.4% 	S
	Licensed at 19–20 years	57.0% 	S
	Metropolitan crashes	74.4% 	S
	Country crashes	58.8% 	S

* S – significant, p<0.05, NS – not significant

Table 36: Statistically significant results comparing modelled FSI crash involvement rates of P1 drivers with comparison group

No. peer passengers	Driver group (0 to <1 year)	Percent change	Significance*
Drivers with 2 or more peer passengers	Overall	69.2%	S
	Male	69.7%	S
	Female	65.6%	S
	Licensed at 18 years	Not modelled	NA
	Licensed at 19–20 years	Not modelled	NA
	Metropolitan crashes	70.3%	S
	Country crashes	67.7%	S

* S – significant, p<0.05

The tables show that the enhancement of the GLS was accompanied by a very substantial fall in the rate of involvement of first-year P1 drivers (relative to the comparison group) in casualty crashes (69.8%) and in FSI crashes (69.2%) when carrying two or more passengers. The falls were widespread and statistically significant for males and females, for crashes in both metropolitan and country Victoria and, for casualty crash involvements, for both drivers licensed at 18 years and at 19 to 20 years.

Reductions in the rate of casualty crash involvements for drivers carrying none or one peer passenger were also significant, but smaller (9.1% and 12.0% respectively) with the sub-categories of females and crash involvements in Metropolitan Melbourne also registering statistical significance. There were no significant results for involvements in FSI crashes for P1 drivers with none or one passenger.

Key findings summary

Statistical analysis provided the following findings for drivers aged 18 to 20 years at licence and in their first year of driving:

- For P1 drivers, the rate of casualty and FSI crash involvements with two or more peer passengers dropped very substantially relative to the comparison group, by 69.8% for casualty and 69.2% for FSI crash involvements.
- Large reductions in casualty crash rates applied to both males (70.4%) and females (67.7%) and in metropolitan (74.4%) and country (58.8%) areas.
- Large reductions also occurred for FSI crash rates for males (69.7%) and females (65.6%) and in metropolitan (70.3%) and country (67.7%) areas.
- There were significant reductions for P1 drivers in casualty crash involvement rates while carrying no peer passenger (9.1%) and while carrying one peer passenger (12.0%) with

the sub-categories of females and crash involvements in metropolitan areas also registering statistical significance in both these passenger categories.

Discussion

The results of the analyses point to a very substantial impact of the requirement that P1 drivers carry at most one peer passenger. The rates of involvement of first-year drivers in both casualty and FSI crashes with two or more peer passengers have reduced by more than 60%. Reductions by similar amounts apply broadly across male and female drivers, across metropolitan and country areas and, for casualty crash involvements, for drivers licensed at 18 years and for those licensed at 19 or 20 years. The reduction in crash involvements with the first-year driver carrying two or more peer passengers makes a significant contribution to the overall reduction in casualty crash involvements of first year drivers aged 18 to 20 years at licence. These results receive support from those found in the probationary survey where there was a significant drop reported in the number of P1 drivers carrying more than one peer passenger post-GLS.

A reasonable question to raise is whether these passengers have transferred to become young drivers instead, increasing the exposure of young drivers on the road overall. It is unclear if this has happened to any significant degree but, even if that were the case, the results in this chapter have pointed to an overall significant and substantial reduction in casualty and FSI crash involvement rates relative to the comparison group among first year drivers aged 18 to 20 years at licence relative to the comparison group. In this context, it is worth noting that the crash involvement rates for P1 drivers carrying none or one peer passenger also reduced relative to the comparison group. However, in light of needing to balance young driver mobility needs with crash outcomes, it is recommended that the peer passenger restriction remain as is, allowing the carriage of one peer passenger by a P1 driver.

Learner permit holders: time series

Aims

This section examines if there has been an increase over time in crash involvements of learner permit holders as a result of increased levels of on-road exposure from the requirement to achieve a minimum 120 hours of supervised practice if licensed under 21 years of age.

Analysis approach

Prior findings in this evaluation have pointed to increases in hours of supervised practice over time among learner permit holders (excluding those who obtained their permit at 16 years who achieved 120 hours of supervised practice from the year 2000 onwards) due to on-going promotion in the years leading up to the enhanced GLS and as a result of the GLS itself. As a result, it is worthwhile to consider how crash involvement rates of learner drivers have varied over time and the degree to which they contribute positively or otherwise to reduced crash involvements by young drivers. Involvements were broken down according to whether the learner driver was supervised or unsupervised.

Accordingly, crash involvement rates per unit of exposure (days of permit holding), converted to a rate of 10,000 driver years, were calculated by financial year over time for learner permit holders. Rates were calculated for all casualty crash involvements and for fatal and serious injury crash involvements. The design of the analysis was:

Study period:	2001/02 to 2013/14 (13 years)
Learner drivers:	Learner permit holders within the first six years after issue of the permit during the study period (no maximum age applied)
Comparison group:	None
Independent variables:	Level of supervision – supervised/unsupervised

Results

Casualty crash involvement rates over the 13 financial years are shown in Figure 36 and the corresponding results for FSI crash involvements in Figure 37. The time series are shown separately for supervised and unsupervised drivers as well as for their combined total.

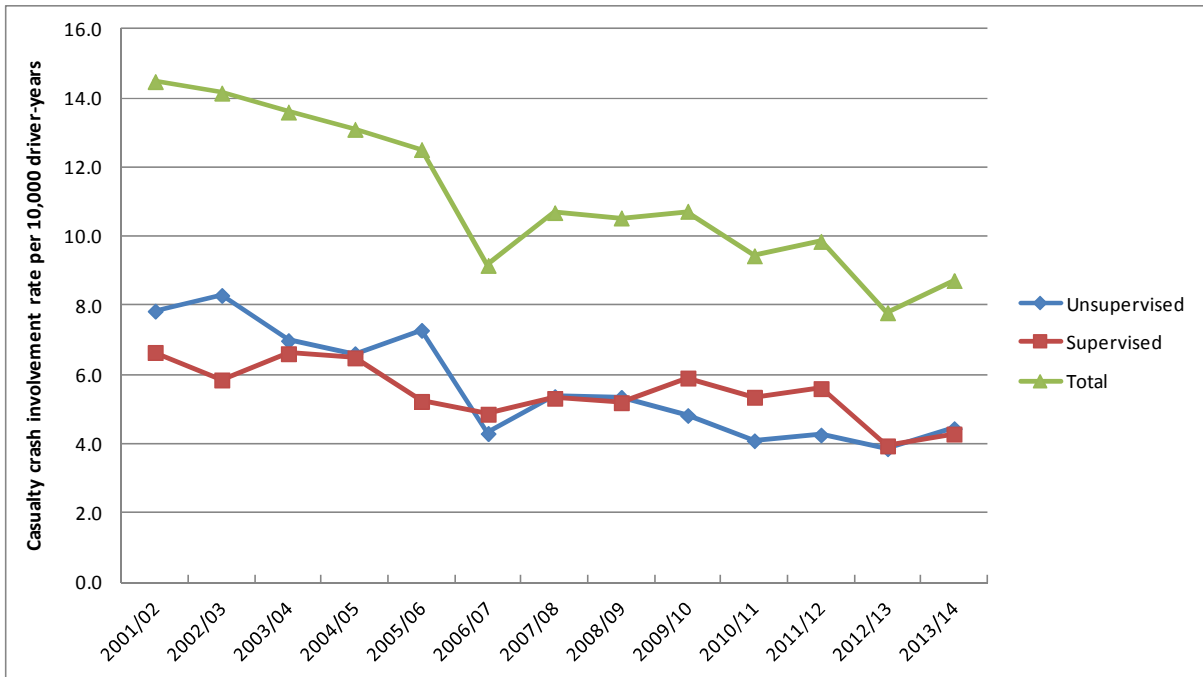


Figure 36: Casualty crash involvement rate per 10,000 driver-years by supervision at the time of the crash for learners who have held the permit less than six years

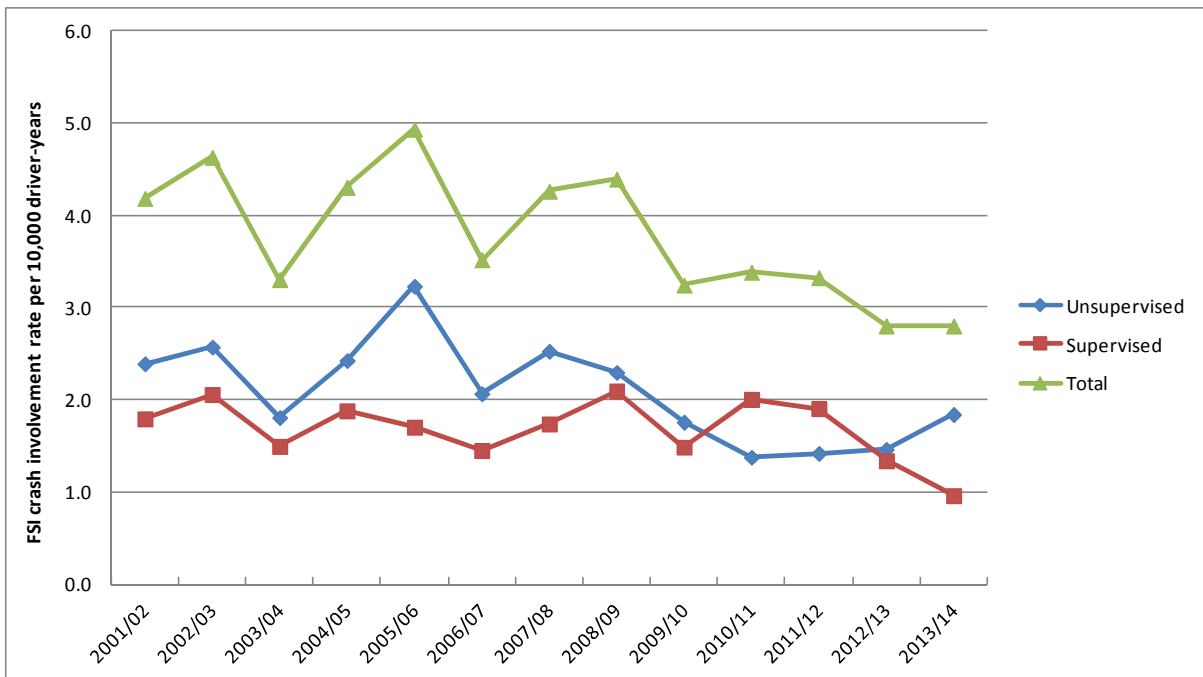


Figure 37: FSI crash involvement rate per 10,000 driver-years by supervision at the time of the crash for learners who have held the permit less than six years

The figures show that casualty and FSI crash involvement rates for learner drivers experienced a fairly steady downward trend throughout the study period with approximately equal contributions from supervised and unsupervised drivers.

The tables in Appendix H of Catchpole et al. (2016) on pages 136 to 145 show that total crash involvement numbers of learners, with approximately equal numbers of those

supervised and unsupervised, remained relatively stable over the thirteen year study period - approximately 220 casualty and 70 FSI crash involvements per annum.

Key findings summary

The key findings are:

- Casualty and FSI crash involvement rates for learners trended generally downwards over the study period (from a casualty crash rate of over 14 in 2001/02 to around 9 in 2013/14 [4.1 to 2.9 for the FSI rate]) and were fewer post-GLS than pre-GLS.
- Supervised and unsupervised drivers made similar contributions to the number of crash involvements each year.
- The total contribution of learner drivers to overall young driver crash involvements is very small compared with the crash rates for novice and experienced drivers.

Discussion

The learner crash results are against a background of increases in learner permit tenure and accumulation of a larger number of supervised practice hours. There was a gradual decrease, with some fluctuations, in rates of crash involvement when standardised by learner-years of driving. It is likely that as hours of practice accumulate and higher order skills develop, the learner driver becomes less likely to be involved in a casualty crash and this is reflected in the gradual downward trend in involvement rates. However, the impact of other ambient and external influencing factors over the study period should not be discounted. The similar contribution of learner drivers illegally driving a vehicle with no supervisor present to those with a supervisor should be noted.

Importantly, in the context of assessing the overall impact of the GLS and the related safety measures that preceded its introduction, the contribution of learner drivers to total young driver crash involvements is very small.

DISCUSSION

The weight of evidence points to the enhanced GLS together with the suite of measures that preceded its introduction having made a significant contribution to enhancing the safety of young drivers on Victoria's roads. While it has not been possible to tease out the individual impact of all components of the package of measures, components such as the P1 passenger restriction, the extended learner permit period and the 120 hour requirement were able to be assessed separately (via the crash statistical analysis, learner permit trends analysis and learner monitor survey statistical analysis respectively).

Given the commitment of the Victorian Government to adopting a Safe System approach within its new Road Safety Strategy and Action Plan (Victoria State Government 2016), the collective impact of the measures upon the absolute numbers of young drivers aged 18 to 23 years being involved in crashes involving death, serious injury or minor injury was also estimated. Relative to an older, more experienced comparison group, the GLS plus its preceding suite of measures over the thirteen years of the study were accompanied by a substantial estimated saving of young driver (18 to 23 years) crash involvements in approximately 150 FSI crashes and 650 casualty crashes each year.

Reductions in crash rates, measured on a 'per driver-year' basis, were evident for drivers aged 18 to 20 years at involvement in both casualty crashes (13.6%) and FSI crashes (20.3%) relative to the comparison group. Similar reductions were observed for drivers aged 18 to 23 years at licence in their first year of driving with drops in their casualty and FSI crash involvement rates of 18.7% and 19.4% respectively. Drops were significant for both metropolitan and country crashes as well as for both males and females involved in casualty crashes. It was the subgroup of first-year drivers aged 18 to 20 years at licence, and so subject to all of the new provisions of the GLS, who made by far the largest contribution to these rate reductions.

The peer passenger restriction was successful in substantially reducing the rate of casualty crash involvement (69.8%) and FSI crash involvement (69.2%) of first year drivers while carrying two or more peer passengers. Once again, reductions applied to both males and females and for crashes that occurred both in metropolitan and country areas of Victoria. These results were borne out by findings of the probationary driver survey in which self-reported carriage of multiple peer passengers by P1 drivers fell significantly after the introduction of the enhanced GLS.

The analyses point to the enhanced GLS having had little effect in improving the safety of novice drivers in their second and third years of driving post-licence compared with the

experienced comparison group. Fourth year drivers, a group that was licensed early in the transitional phase following GLS introduction, registered a relative increase in their rate of casualty crash involvements, but not in their FSI crash involvements. The reasons underpinning the increase require further investigation. Fourth year drivers did show, however, a significant 19.9% reduction in casualty crashes during 'high alcohol hour' crashes in the Metropolitan Melbourne, especially in single-vehicle crash involvements. This result was supported by findings of the probationary driver survey in which self-reported rates of drink-driving halved post-GLS among drivers in their fourth year of driving. Fourth year drivers were subject to a zero blood alcohol requirement post-GLS while their counterparts' pre-GLS were subject to a 0.05 g/100 ml requirement.

Over the fifteen year study period, hours of practice for 17 year old learners have more than doubled to achieve an average of 127 hours total supervised practice in 2014, while only small increases have occurred for those taking out learner permits at a later age. Sixteen year old learners achieved an average of at least 120 hours of practice well before introduction of the GLS and accumulated an average of 137 hours in 2014. The enhanced GLS together with the suite of promotional and educational measures that preceded it appear to have been very successful in increasing the level of supervised practice – especially among those who will obtain their licence in the age range of 18 to 20 years. Despite the general trend towards increased hours of supervised practice as a learner (increased exposure), casualty and FSI crash involvement rates for learners trended downwards over the study period with their total contribution to young driver crash involvements remaining very small.

With regard to traffic offences, there were no substantial reductions in the overall offence rates of newly licensed drivers as a result of the enhanced GLS. Analyses within offence categories, however, gave rise to mixed results. For drivers aged 18 to 20 years at licence in their first and second years of driving, reductions in alcohol-related and court-related offences were observed (the court-related offence rate drop for second year drivers being non-significant). These results are encouraging and may reflect the enhanced GLS requirement that a serious offence leading to a licence ban will result in a six month extension to the probationary stage.

In contrast, speed-related offences increased for drivers licensed at ages 18 to 20 years over each of their first three years of driving by 4.3%, 9.9% and 6.5% respectively. The increases in speed-related offences, however, cannot readily be explained in terms of being a direct outcome of introducing the GLS. It is possible that experienced drivers are more attuned and responsive in the short term to substantial changes in speed enforcement levels than are young, inexperienced drivers. Alternatively or in addition, driving exposure post-

GLS (as measured by 'distance travelled', for example) may be greater than pre-GLS among the driver group aged 18 to 20 years at licence that remain after the migration of some drivers to take out their licence at age 21 years or older. These explanations, however, would need to be the subject of further investigation.

The choice of study periods has meant that when combining crash involvements across years of experience, those with more experience are under-represented in the combined total. As a consequence, by adjusting for this under-representation, it was estimated that in the longer term drivers aged 18 to 23 years at licence and in their first four years of driving would experience reductions of 5.1% and 9.3% in casualty and FSI crash involvement rates respectively.

There are several mechanisms that were likely to be influential in improving the safety of beginning young drivers:

- The promotional and educational safety measures that were introduced over the decade leading up to GLS introduction resulted in the early achievement of 120 hours of supervised practice by those aged 16 years and the steady improvement in practice hours over the period for those aged 17 years and, to some extent, those older at learner permit issue.
- The direct impact of the specific measures introduced as part of the GLS:
 - the 120 hour requirement itself together with a 12 month minimum learner permit tenure and a new challenging Drive Test that collectively supported continued improvement in learner practice hours and postponement of age at licence to later within the 18 to 20 year range (which facilitates a crash reduction effect from greater maturity of the novice driver)
 - the peer passenger restriction and its direct safety impact
 - the extension of the zero blood alcohol requirement to the fourth year of the enhanced GLS.
- The indirect impact of the enhanced GLS including an extended learner permit period and 120 hour requirement that resulted in a shift in licensing age to later years with especially marked increases in numbers taking out their first licence at age 21 years or older. This resulted in the benefit of reduced exposure during the intervening years before licensing and reduced risks as young people are more mature at licensing.

Delbosc and Currie (2013) point to factors such as spending money on other things, the cost of motoring and a reliance on other forms of transport as key reasons for young people in general deciding to postpone sitting for their licence. For those who did not intend to take out a licence, difficulties in getting at least 120 hours of practice and probationary restrictions

were deemed to be less important. Nevertheless, it is possible that the requirements of the enhanced GLS on top of existing reasons, such as those listed above, provided further impetus for some young people to postpone taking out a licence. Young people with fewer transport options and a greater need to drive may well be those more likely to take out a licence earlier rather than later and so will be subject to all the provisions of the enhanced GLS.

The impact of the GLS on crash involvement rates appears to be greatest for drivers licensed at ages 18 to 20 years in their first year of driving, the year in which they must first pass through an enhanced 'gateway' that includes an evidence-based Drive Test, and then experience a range of GLS provisions including the peer passenger restriction and a ban on all mobile phone use. These drivers also experience the immediate benefit of the minimum 120 hours of driving practice requirement, which provides a crash protective effect for drivers during the first year of driving after getting a solo licence (Gregersen 1997).

With a view to assessing the true impact of the GLS upon crash involvements, reasonable precautions were taken to avoid those years immediately leading up to and following the introduction of the GLS in conducting the analysis comparing 'before' with 'after' crash involvement rates. A spike in licences issued preceded the GLS with a corresponding dip in licences issued in the first year of the GLS. The migration of some young people to taking out their licence at a later age has meant that a new 'equilibrium' in licence age profile can only be established after some years have passed. Accordingly, 'before' and 'after' periods for comparing crash involvement rates were chosen to account for these influences as far as possible.

Evaluations in the real world inevitably involve making a number of assumptions, key among them being the choice of comparison group. The comparison group serves the purpose of reflecting changes that have occurred in the external environment that would equally affect the crash involvement rates of the comparison and the novice group. Any differences that occur in the change of rates between the two groups can then be attributed to measures directed at the package of GLS measures to improve young driver safety alone. While every effort has been made to choose comparison groups that reflect this requirement, there is no guarantee that the outcome has been totally successful. For example, it is conceivable that changes in enforcement activity and the rapid improvement in vehicle technology over the study period have differentially affected the novice and comparison groups. Moreover, the change in licensing age profile following GLS introduction could mean 'like with like' is no longer being compared, for example, drivers aged 18 to 20 years post-licence may exhibit characteristics different to their equivalents pre-GLS. For instance, they may have less access to public transport and require a car to travel for all purposes with an increased

relative exposure to crash risk the result. The exposure measure used in this evaluation of 'driver-years' does not account for changes in time on-road, nor distances travelled.

It is for these reasons that no definitive 'cause – effect' relationships can be reported. Nonetheless, the weight of evidence pointing to the positive influence of the enhanced GLS and the preceding supporting measures is appreciable.

CONCLUSION

The enhanced GLS together with the suite of measures that preceded its introduction were very influential in enhancing the safety of young drivers on Victoria's roads.

Over the thirteen year span of the study, the absolute number of young drivers aged 18 to 23 years in casualty crashes has fallen much faster than for the more experienced comparison group, a very positive outcome to which the GLS and related measures have in all likelihood made a significant contribution.

The safety gains were felt most strongly by first-year drivers aged 18 to 20 years at licensing, their rates of involvement in casualty crashes and in FSI crashes dropped by 19.2% and 21.7% respectively relative to the comparison group. This is the driver group with the highest crash involvement rates pre-GLS and, appropriately, subject to all the provisions of the enhanced GLS in its P1 stage.

The reduction in first-year driver casualty crash involvement rate was partly offset by a 17.1% increase in the casualty (but not FSI) crash involvement rate for fourth year drivers aged 18 to 20 years at licence, a group licensed during the transitional phase following introduction of the enhanced GLS and possibly atypical of the composition of this group in the longer term. Despite this increase, safety gains experienced by first-year drivers substantially outweighed the losses attributed to fourth-year drivers.

With a view to assessing the overall safety impact of the GLS interventions, it was estimated that drivers aged 18 to 23 years at licence and in their first four years of driving would experience a 5.1% and a 9.3% reduction in casualty and FSI crash involvement rates respectively.

The key measures by means of which the safety gains for beginning young drivers were achieved are:

- The safety measures that were introduced over the decade leading up to GLS introduction together with the GLS resulted in increased hours of supervised driving practice, especially among those aged 16 and 17 years at learner permit.
- The direct impact of the specific measures introduced as part of the enhanced GLS:
 - the 120 hour requirement itself together with a 12 month minimum learner permit tenure and a new challenging Drive Test that collectively supported continued improvement in learner practice hours and postponement of age at licence to later within the 18 to 20 year range
 - the peer passenger restriction and its direct safety impact

- the extension of the zero blood alcohol requirement to the fourth year of the enhanced GLS.
- The indirect impact of the enhanced GLS including an extended learner permit period and 120 hour requirement that resulted in a migration to late licensing with marked increases in numbers taking out their first licence at age 21 years or older. This resulted in the benefit of reduced exposure during the intervening years before licensing and reduced risks as young people are more mature at licensing.

The evidence strongly points to the GLS together with the preceding suite of measures to promote increased learner practice and reduced risk taking having been very influential in improving the safety of beginning young drivers, especially those aged 18 to 20 at licence and in their first year of driving. The new provisions for learner and P1 drivers within the enhanced GLS have made valuable contributions to improving the safety of beginning drivers.

REFERENCES

- ABS 2011, 1270.0.55.005 - *Australian Statistical Geography Standard (ASGS): Volume 5 - Remoteness Structure, July 2011*, Australian Bureau of Statistics, ACT, viewed April 2016, <<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/2C28C8B6013FB2D0CA257B03000D6DA8?opendocument>>.
- Begg, D & Stephenson, S 2003, 'Graduated driver licensing: the New Zealand experience', *Journal of Safety Research*, vol. 34, no. 1, pp. 9–105.
- Catchpole, J 2015, *Offence rates before and after changes to the Graduated Licensing System*, ARRB Group, Vermont South, Victoria, report for VicRoads (unpublished).
- Catchpole, J, 2016, *Trends in Driver Licensing in Victoria*, ARRB Group, Vermont South, Victoria (internal report for VicRoads).
- Catchpole, J, Makwasha, T & Newstead, S 2016, *Crash involvement rates before and after changes to Victoria's Graduated Licensing System*, ARRB Group, Vermont South, Victoria, report for VicRoads (unpublished).
- Cavallo, A & Oh, S 2008, 'An overview of Victoria's new drive test: The GLS context and summary of results', *Australasian Road Safety Research, Policing and Education Conference, Adelaide, South Australia*, Australasian College of Road Safety, viewed 20 July 2016, <<http://acrs.org.au/files/arsrpe/RS080173.pdf>>.
- Delbosc, A & Currie, G, 2013, 'Causes of youth licensing decline: A synthesis of evidence', *Transport Reviews*, vol. 33, no. 3, pp. 271–90.
- Drummond, A 2004, *The risks of crashing while driving around Melbourne*, VicRoads, Kew, Victoria.
- Gantzer S 1995, *Update of high alcohol times in Victoria*, research note, Monash University Accident Research Centre, Melbourne, Victoria.
- Gregersen, NP 1997, *Evaluation of 16-years age limit for driver training*, VTI Rapport 418A, Swedish National Road and Transport Research Institute, Linköping, Sweden.
- Healy, D, Catchpole, J & Harrison, W 2012, *Victoria's Graduated Licensing System evaluation: interim report*, VicRoads, Victoria, viewed 30 May 2016, <<https://www.vicroads.vic.gov.au/safety-and-road-rules/driver-safety/young-and-new-drivers/victorias-graduated-licensing-system>>.
- McIntyre, A. 2015a, *Evaluation of Victoria's Graduated Licensing System: The Cross-section Surveys 2008–2012*, report for VicRoads (unpublished), Victoria.
- McIntyre, A. 2015b, *Evaluation of Victoria's Graduated Licensing System: The Cohort Surveys 2008–2012*, report for VicRoads (unpublished), Victoria.
- McIntyre, A. 2015c, *Evaluation of Victoria's Graduated Licensing System: GLS Surveys 2008–2012 Summary Report*, report for VicRoads (unpublished), Victoria.

- Meyer, D, Cunningham, C, Rajendran, N, Imberger, K, Pyta, V, Mitsopoulos-Rubens, E & Catchpole, J, 2015a, 'Monitoring changes from 1999 to 2014 in the amount of supervised driving experience accrued by Victorian learner drivers', *Australasian Road Safety Conference, Gold Coast*, Australian College of Road Safety, viewed 13 May 2016, <<http://acrs.org.au/files/papers/arsc/2015/ImbergerK%20167%20Monitoring%20changes%20from%201999%20to%202014%20in%20the%20amount%20of%20supervised%20driving%20experience%20accrued%20by%20Victorian%20learner%20drivers.pdf>>.
- Meyer, D, Cunningham, C & Rajendran, N, 2015b, *Learner Driver Experience Monitoring 2014 – Statistical Report*, Swinburne University of Technology, unpublished report for VicRoads, Victoria.
- Meyer, D, Cunningham, C, Rajendran, N 2014, *Learner Driver Experience Monitoring 2014 (Final Report)*, Swinburne University of Technology, unpublished report for VicRoads, Victoria.
- NRMA 1988, *Road safety milestones: The NRMA's reference guide to major changes by Australian State governments to vehicle equipment standards, traffic regulations and traffic engineering procedures which affect road safety*, 2nd edition, National Roads and Motorists' Association, New South Wales.
- Senserrick, TM & Williams, AF, 2014, *Summary of literature of the effective components of Graduated Driver Licensing Systems*, report no. AP-R476–15, Austroads, Sydney.
- Shope, JT 2007, 'Graduated driver licensing: Review of evaluation results since 2002', *Journal of Safety Research*, vol. 38, no. 2, pp. 165–75.
- VicRoads 2005, *Young Driver Safety and Graduated Licensing, Discussion Paper*, VicRoads, Kew (unpublished report, previously released for public discussion in 2005 before the implementation of the GLS).
- Victoria State Government 2016, *Towards Zero 2016–2020: Victoria's Road Safety Strategy & Action Plan*, Victoria State Government, viewed 24 June 2016, <https://www.towardszero.vic.gov.au/__data/assets/pdf_file/0010/183556/STU_0206_RS_STRATEGY_2016_web.pdf>.
- Williams, AF, Tefft, BC, & Grabowski, JG 2012, 'Graduated Driver Licensing Research, 2010-Present', *Journal of Safety Research*, vol. 42, pp. 195–203.

Appendix A – Young driver support programs

Licensing stage	Typical age group	Education initiatives
Pre-learner	15–16 years	<p>The <i>Road to Solo Driving</i> provides information about road laws and a range of road safety information and needs to be studied by learner permit applicants.</p> <p>Traffic safety education programs targeting Year 10 students in schools (during their last compulsory year of schooling).</p>
Learner	16–18 years	<p>The <i>Learner Kit</i> is given to all learner drivers and provides information to learners and their supervisors on how to best obtain the minimum 120 hours of practice in a variety of driving and road conditions and strategies to reduce crash risk. Learners aged under 21 at licensing are required to record their 120 hours practice in the <i>Learner Log Book</i>, in the <i>Learner Kit</i>.</p> <p>The <i>Guide for Supervising Drivers</i> is also given as part of the <i>Learner Kit</i> and aims to provide support and advice to supervising drivers about how to manage and maximise the benefits of the learner period.</p> <p><i>Keys Please</i> is a free information session provided statewide to Year 10 students to support 120 hour acquisition and tips and strategies for learners to use.</p> <p><i>Lessons from the Road</i>, an online video resource is available to parents to assist their learners in 120 hour acquisition.</p> <p><i>L2P - Learner Driver Mentor Program</i> is a community-based volunteer mentor program, which is available to assist disadvantaged learners to get a minimum 120 hours of supervised driving experience (pilot programs commenced in 2007, with wide availability since 2008).</p> <p><i>Year 12 Muck-Up Day</i> is a TAC program exploring the consequences of risky driving.</p> <p>The Year 11 <i>Fit2Drive (F2D)</i> behaviour change program helps participants to make good decisions when faced with risky driving situations, both as passengers, and in terms of their future driving safety.</p>
P1	18–19 years	<p>The <i>Probationary Kit</i> is given to all P1 drivers and provides information about probationary rules, risks for new drivers and strategies to minimise these risks. The Kit also contains advice to parents about keeping their young driver safe.</p> <p>The TAC's <i>First Car List</i> details safe and affordable used cars (all cars have a 4–5 star used car safety rating and cost under \$15,000) (howsafeisyourfirstcar.com.au).</p> <p>CGT is an iPhone app which aims to educate young drivers about the dangers of</p>

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Licensing stage	Typical age group	Education initiatives
		<p>mobile phone use while driving.</p> <p><i>RoadMode</i> is an Android app which puts the driver's phone on silent and alerts incoming calls and texts that the person is driving.</p> <p><i>Make a Film, Make a Difference</i> is a TAC initiative encouraging young people to write an idea for a short film that will challenge young peoples' attitudes to driving, independence and looking out for their mates.</p>
P2 and newly transitioned to full licence	19–22 years 21–26 years	<p>The TAC's <i>First Car List</i> details safe and affordable used cars (all cars have a 4–5 star used car safety rating and cost under \$15,000).</p> <p><i>CGT</i> is an iPhone app which aims to educate young drivers about the dangers of mobile phone use while driving.</p> <p><i>RoadMode</i> is an Android app which puts the driver's phone on silent and alerts incoming calls and texts that the person is driving.</p> <p><i>Make a Film, Make a Difference</i> is a TAC initiative encouraging young people to write an idea for a short film that will challenge young peoples' attitudes to driving, independence and looking out for their mates.</p>

Appendix B – Descriptions of selected offences

This appendix lists the offences for the three main groupings used in the offence analysis:

- exceed BAC limit offences (one category)
- court or TIN offences (two categories)
- speed-related, alcohol-related or other offences (three categories).

Each offence is listed by the above grouping and category with frequency and percentage of occurrence in descending order. The frequencies presented here are combined frequencies for all driver groups in the study (pre- and post-GLS treatment and control groups).

Table 37: Exceed BAC limit offences

DLS short offence description	Frequency	Percent
HAVE/EXCEED P.C.A WITHIN 3HR BREATH TEST	3,756	29.4
EXCEED PCA .070% - .099%	2,025	15.8
EXCEED PCA .000% - .049%	1,906	14.9
EXCEED PCA .050% - .069%	1,803	14.1
EXCEED PRESC CONCENTRATION OF ALCOHOL	1,159	9.1
EXCEED PCA .100% - .109%	457	3.6
EXCEED PCA .110% - .119%	398	3.1
EXCEED PCA BETWEEN .120% - .129%	300	2.3
HAVE/EXCEED P.C.A WITHIN 3HR BLOOD TEST	290	2.3
EXCEED PCA BETWEEN .130% - .139%	234	1.8
EXCEED PCA BETWEEN .140% - .149%	205	1.6
DRV MID RANGE OF BLOOD ALCOHOL CONTENT	98	0.8
DRV LOW RANGE OF BLOOD ALCOHOL CONTENT	59	0.5
DRV HIGH RANGE OF BLOOD ALCOHOL CONTENT	28	0.2
HAVE PRESCRIBED CONCENTRATION 3HRS-BLOOD	19	0.1
BLOOD ALCOHOL CONTENT IN EXCESS OF .08%	14	0.1
DRV SPECIAL RANGE BLOOD ALCOHOL CONTENT	9	0.1
DRV NOV RANGE OF BLOOD ALCOHOL CONTENT	5	0
ACCOMPANYING DRIVER EXCEED P.C.A. (.00%)	3	0
HAVE PRESCRIBED CONCENTRATION 3HRS BLOOD	3	0
BLOOD ALCOHOL CONTENT IN EXCESS OF .05%	2	0
DRIVE SPECIAL RANGE CONCENTRATION ALCOHOL	2	0
DRIVE - EXCESS BAC IN SYS	1	0
DRIVING INSTRUCTOR P.C.A .05% OR ABOVE	1	0
Total	12,777	100.0

Table 38: Court offences

DLS short offence description	Frequency	Percent
DRIVE WHILST AUTHORISATION SUSPENDED	12,079	25.3
CARELESS DRIVING	6,462	13.5
HAVE/EXCEED P.C.A WITHIN 3HR BREATH TEST	3,756	7.9
DRIVE WHILST DISQUALIFIED	3,440	7.2
DRIVE WITHOUT PLATES DISPLAYED	2,307	4.8
UNLICENSED DRIVING	1,568	3.3
DRIVE IN A DANGEROUS MANNER	1,381	2.9
EXCEED PRESC CONCENTRATION OF ALCOHOL	1,159	2.4
EXCEED SIGNED SPEED LIMIT - 100KPH	931	1.9
EXCEED SIGNED SPEED LIMIT - 60KPH	914	1.9
DISOBEY TRAFFIC CONTROL SIGNAL	820	1.7
CARELESS DRIVING-IMPROPER USE OF VEHICLE	781	1.6
S/BELT NOT FASTENED/ADJ	774	1.6
FAILING TO CARRY PROBATIONARY LICENCE	691	1.4
USE HAND HELD MOBILE PHONE-VEH MOVING	657	1.4
DRIVE AT A DANGEROUS SPEED	541	1.1
EXCEED SIGNED SPEED LIMIT - 80KPH	536	1.1
EXCEED SPEED LIMIT - SPEED ZONE	504	1.1
FAIL COMPLY WITH CONDITIONS OF LICENCE	438	0.9
EXCEED SIGNED SPEED LIMIT - 70KPH	368	0.8
CARELESS DRIVING OF A MOTOR VEHICLE	354	0.7
EXCEED 60 SPEED SIGN-BY 10K LESS 25K	303	0.6
HAVE/EXCEED P.C.A WITHIN 3HR BLOOD TEST	290	0.6
REFUSE ACCOMP TO STATION FOR B.TEST	287	0.6
BREACH ALCOHOL INTERLOCK CONDITION	279	0.6
P1 HOLDER CARRYING MORE THAN 1 PASSENGER	269	0.6
PROB DRIVER DRIVING A PROB PROH VEH	246	0.5
EXCEED SIGNED SPEED LIMIT - 50KPH	243	0.5
DRIVE UNDER INFLUENCE OF LIQUOR OR DRUG	204	0.4
EXCEED SPEED LIMIT BY 10KPH BUT LESS 25K	200	0.4
FAIL TO STOP AT STOP SIGN OR LINE	197	0.4
EXCEED DEFAULT SPEED-LIMIT - 100KPH	193	0.4
EXCEED SIGNED SPEED LIMIT - 110KPH	191	0.4
DISOBEY TRAFFIC SIGN	181	0.4
EXCEED 100 SPEED LIMIT SIGN-BY LESS 10K	176	0.4
EXCEED 80 SPEED SIGN-BY 10K LESS 25K	169	0.4
EXCEED SPEED LIMIT BY 45 KPH OR MORE	168	0.4
CARELESS IMPR USE OF VEH	160	0.3
EXCEED SPEED-LIMIT BY LESS THAN 10 KPH	149	0.3
DRIVE MANNER DANGEROUS-IMPROPER USE MV	141	0.3
EXCEED 60 SPEED LIMIT SIGN-BY LESS 10K	138	0.3
FOLLOW TOO CLOSE TO VEHICLE IN FRONT	130	0.3

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
DRIVE WITHOUT REAR PLATE DISPLAYED	126	0.3
EXCEED 100 SPEED LMT SIGN-BY 45K OR MORE	117	0.2
REFUSE UNDERGO BREATH TEST	111	0.2
EXCEED SPEED-LIMIT BY 45 KPH OR MORE	100	0.2
DRV MID RANGE OF BLOOD ALCOHOL CONTENT	98	0.2
EXCEED DEFAULT SPEED-LIMIT - 50KPH	97	0.2
EXCEED 70 SPEED SIGN-BY 10K LESS 25K	92	0.2
REFUSE PRELIMINARY BREATH TEST	90	0.2
EXCEED 50 SPEED SIGN-BY 10K LESS 25K	83	0.2
EXCEED 80 SPEED LMT SIGN-BY 45K OR MORE	78	0.2
EXC 60 SPEED SIGN BY BETWEEN 25 & 35KPH	75	0.2
EXCEED 60 SPEEDLIMIT SIGN-BY 45K OR MORE	74	0.2
EXCEED SIGNED SPEED LIMIT - 40KPH	71	0.1
EXCEED 100 SPEED SIGN-BY 25K LESS 35K	63	0.1
USE HAND HELD MOBILE PH-VEH STATIONARY	63	0.1
EXCEED 40 SPEED SIGN-BY 10K LESS 25K	62	0.1
DRV LOW RANGE OF BLOOD ALCOHOL CONTENT	59	0.1
DRIVE MANNER DANGEROUS CAUSE SERIOUS INJ	55	0.1
EXCEED SPEED IN A SPEED-LIMITED AREA	50	0.1
FAIL GIVE WAY WHEN MOVING TO MARKED LANE	50	0.1
EXCEED DEFAULT SPEED-LIMIT - 60KPH	48	0.1
EXCEED SPEED-LIMIT BY 35KPH BUT LESS 45K	48	0.1
EXCEED 80 SPEED SIGN-BY 35K BUT LESS 45K	46	0.1
EXCEED 70 SPEED LMT SIGN-BY 45K OR MORE	44	0.1
CARELESS DRIVING-IMPROP USE OF MOTOR VEH	42	0.1
DRIVE WHILE AUTHORISATION CANCELLED	42	0.1
EXCEED 100 SPEED SIGN-BY 35K & LESS 45K	42	0.1
EXCEED 80 SPEED SIGN-BY 25K LESS 35K	41	0.1
DRIVE AT SPEED DANGEROUS-IMPROPER USE MV	40	0.1
EXCEED 60 SPEED SIGN-BY 35K BUT LESS 45K	39	0.1
FAIL TO GIVE RIGHT OF WAY	38	0.1
DRIVE IN BREACH OF PERMIT CONDITION	36	0.1
EXCEED 80 SPEED LIMIT SIGN-BY LESS 10K	36	0.1
DRIVE WITHOUT FRONT PLATE	34	0.1
EXCEED 50 SPEED LIMIT SIGN-BY LESS 10K	31	0.1
EXCEED SIGNED SPEED LIMIT - 10KPH	31	0.1
REFUSE REMAIN AT STATION FOR B. TEST	30	0.1
EXCEED 50 SPEED LMT SIGN-BY 45K OR MORE	29	0.1
EXCEED 70 SPEED SIGN-BY 25K LESS 35K	29	0.1
DRV HIGH RANGE OF BLOOD ALCOHOL CONTENT	28	0.1
LNR OR PROB DRIVER USING ANY MOB PHONE	28	0.1
REFUSE UNDERGO FURTHER BREATH TEST	27	0.1
EXCEED 50 SPEED SIGN-BY 25K LESS 35K	25	0.1

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
EXCEED 70 SPEED LIMIT SIGN-BY LESS 10K	24	0.1
EXCEED 110 SPEED SIGN-BY 35K& LESS 45K	23	0
EXCEED SIGNED SPEED LIMIT - 90KPH	23	0
FAIL TO GIVE WAY AT INTERSECTION	21	0
FAIL GIVE WAY TO VEHICLE - RIGHT TURN	19	0
HAVE PRESCRIBED CONCENTRATION 3HRS-BLOOD	19	0
PASSENGER FAIL WEAR SEATBELT - OVER 16YR	19	0
EXCEED 40 SPEED SIGN-BY 25K LESS 35K	18	0
EXCEED 110 SPEED LIMIT SIGN-BY LESS 10K	15	0
EXCEED 70 SPEED SIGN-BY 35K BUT LESS 45K	15	0
FAIL TO GIVE WAY AT T-INTERSECTION	15	0
BLOOD ALCOHOL CONTENT IN EXCESS OF .08%	14	0
DRIVE WHILST LICENCE SUSPENDED	14	0
FAIL TAKE/SEND SUSP DRIV LIC PLCE SPECFD	14	0
FAIL TO STOP AT PBT STATION	14	0
USE HANDHELD MOBILE PHONE WHILE DRIVING	13	0
EXCEED 90 SPEED SIGN-BY 10K LESS 25K	12	0
DRIVE AT EXCESSIVE SPEED	11	0
DRIVE MANNER DANGEROUS CAUSE DEATH	11	0
FAIL GIVE WAY VEH-RIGHT TURN AT INTERSCT	11	0
USE VEH ON HIGHWAY FOR A TRIAL OF SPEED	11	0
DRIVE WHILE LIC SUSP-INFRINGEMENTS ACT	10	0
EXCEED SPEED IN 40KPH SPEED-LIMITED AREA	10	0
FAIL STOP BEFORE-STOP LINE-YELLOW LIGHT	10	0
PROB DRIVER USE MOBILE PHONE-VEH MOVING	10	0
DRIVE WHILST LICENCE CANCELLED	9	0
DRV SPECIAL RANGE BLOOD ALCOHOL CONTENT	9	0
EXCEED 50 SPEED SIGN-BY 35K BUT LESS 45K	9	0
EXCEED SIGNED SPEED LIMIT - 20KPH	9	0
FAIL SURRENDER LIC OR PERMIT UPON SUSP	8	0
FAIL TO ALLOW DOCTOR TO TAKE BLOOD SAMP	8	0
FAIL TO GIVE WAY TO VEH WHEN TURNING	8	0
DRVE HIGH POWERED M/VEH-PROBATIONARY LIC	7	0
EXCEED 110 SPEED SIGN-BY 25K LESS 35K	7	0
UNDER THE INFLUENCE OF LIQUOR OR DRUG	7	0
FAIL GIVE WAY TO PEDESTRIANS	6	0
FAIL TO GIVE WAY AT GIVE WAY LINE	6	0
REFUSE TO ALLOW BLOOD SAMPLE TO BE TAKEN	6	0
DRV NOV RANGE OF BLOOD ALCOHOL CONTENT	5	0
FAIL TO COMPLY NOTICE CANC/SUSP-SPEED	5	0
FAIL TO UNDERGO PRELIMINARY BREATH TEST	5	0
OBTAIN LICENCE BY FALSE STATEMENT	5	0
P1 PROB DRIVER USE MOB PH-VEH STATIONARY	5	0

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
EXCEED 110 SPEED LMT SIGN-45K OR MORE	4	0
EXCEED 110 SPEED LMT SIGN-BY 45K OR MORE	4	0
EXCEED SPEED-SPEED LTD AREA-10K LESS 25K	4	0
ACCOMPANYING DRIVER EXCEED P.C.A. (.00%)	3	0
EXCEED 40 SPEED LIMIT SIGN-BY LESS 10K	3	0
EXCEED 40 SPEED LMT SIGN-BY 45K OR MORE	3	0
EXCEED 40 SPEED SIGN-BY 35K BUT LESS 45K	3	0
EXCEED SPEED-60KPH LTD AREA-10K LESS 25K	3	0
FAIL GIVE WAY VEH WHEN MAKING U-TURN	3	0
FAIL TO GIVE WAY FROM ADJACENT LAND	3	0
HAVE PRESCRIBED CONCENTRATION 3HRS BLOOD	3	0
RIGHT TURNING VEHICLE - FAIL TO GIVE WAY	3	0
BLOOD ALCOHOL CONTENT IN EXCESS OF .05%	2	0
DRIVE HIGH POWERED VEH PROB NOT EXPIRED	2	0
DRIVE PROB PROHIBITED M/VEH-PROB LIC	2	0
DRIVE SPECIAL RANGE CONCENTRATION ALCOHO	2	0
EXCEED 110 SPEED LIMIT BY 35 KPH OR MORE	2	0
EXCEED SPEED IN 50KPH SPEED-LIMITED AREA	2	0
FAIL GIVE WAY TO VEHICLE-DIVIDING STRIP	2	0
FAIL GIVE WAY- ENTERING LINE OF TRAFFIC	2	0
FAIL TAKE/SEND CANC DRIV LIC PLCE SPECFD	2	0
FAIL TO STOP AT STOP SIGN	2	0
HEAVY VEH EXCEED SPEED-LIMIT 10K LESS 25	2	0
OBTAIN LICENCE BY MISREPRESENTATION	2	0
AID AND ABET EXC MID RANGE BAC	1	0
CONSUME INTOX LIQ WHLE DRIVING MOTOR VEH	1	0
DANGEROUS DRIVING	1	0
DRIVE - EXCESS BAC IN SYS	1	0
DRIVE VEH ALCOHOL INTERLOCK DISENGAGED	1	0
DRIVING INSTRUCTOR P.C.A .05% OR ABOVE	1	0
EXCEED 100K DEFAULT LMT-BY 10K LESS 25K	1	0
EXCEED 50K DEFAULT LIMIT-BY 25K LESS 35K	1	0
EXCEED 90 SPEED SIGN-BY 25K LESS 35K	1	0
EXCEED SIGNED SPEED LIMIT - 30KPH	1	0
EXCEED SPEED-60 SPEED LTD AREA-35K&/<45K	1	0
EXCEED SPEED-SPEED LTD AREA-BY LESS 10K	1	0
FAIL COMPLY COND SPECIAL LIC OR PERMIT	1	0
FAIL GIVE WAY TO PED WHILE TURNING	1	0
FAIL GIVE WAY TO PEDESTRIAN ON CROSSING	1	0
FAIL GIVE WAY TO VEH-STOP SIGN/STOP LINE	1	0
FAIL STOP & GIVE WAY AT STOP LINE	1	0
FAIL STOP B/F INTERSECTION-YELLOW LIGHT	1	0
FAIL STOP B/F STOP LNE-YELLOW TRAF ARROW	1	0

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
FAIL SURRENDER CANCELLED DRIVER LICENCE	1	0
FAIL TO ACCOMPANY TO STATION FOR B TEST	1	0
FAIL TO COMPLY NOTICE CANC/SUSP - DRINK	1	0
FAIL TO GIVE WAY TO TRAIN-LEVEL CROSSING	1	0
FAIL TO GIVE WAY TO VEHICLE - LEFT TURN	1	0
FAIL TO GIVE WAY WHEN MERGING	1	0
HEAVY VEH EXCEED 100 SIGN-BY LESS 10 KPH	1	0
HEAVY VEH EXCEED 80K SIGN-25K LESS 35K	1	0
OBT LIC DURING DISQUALIFICATION PERIOD	1	0
PROB DRIVER DRIVE CORP DEC PROB PROH VEH	1	0
PROB DRIVER DRIVE VEH WITH HIGH POWR MOD	1	0
PROB DRIVER DRIVING A HIGH POWER VEH	1	0
REFUSE ACCOMP CORP OFFR FOR BLOOD ANALYS	1	0
REFUSE ACCOMP POLICE FOR BLOOD ANALYSIS	1	0
REFUSE REMAIN FOR BLOOD SAMPLE BE TAKEN	1	0
SPEED EXCEED 60 KPH IN A 60 KPH ZONE	1	0
SPEED EXCEED 80 KPH IN A 80 KPH ZONE	1	0
Total	47,822	100.0

Table 39: TIN offences

DLS short offence description	Frequency	Percent
X SPEED BY LESS THAN 10K	301,952	45.1
X SPEED BETWEEN 15K - 24K	87,234	13.0
X SPEED BETWEEN 10K - 14K	79,526	11.9
DISOBEY TRAFFIC CONTROL SIGNAL	52,068	7.8
DRIVE WITHOUT P PLATES	31,255	4.7
USE HANDHELD MOBILE PHONE WHILE DRIVING	27,916	4.2
S/BELT NOT FASTENED/ADJ	15,077	2.3
PROB FAIL HAVE LIC POSS	9,991	1.5
X SPEED BETWEEN 25K - 29K	9,100	1.4
DISOBEY TRAFFIC SIGN	6,262	0.9
X SPEED BETWEEN 30K - 34K	6,254	0.9
P1 HOLDER CARRYING MORE THAN 1 PASSENGER	6,084	0.9
FAIL TO OBEY LICENCE COND	4,296	0.6
FOLLOW TOO CLOSELY	3,092	0.5
UNLIC DRV OTHER CIRCUMSTS	2,909	0.4
UNLIC PREV L OR IDP EXP	2,839	0.4
FAIL SEAT BELT ADJ (PASS)	2,821	0.4
X SPEED BETWEEN 35K - 39K	2,650	0.4
EXCEED PCA .070% - .099%	2,025	0.3

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
EXCEED PCA .000% - .049%	1,906	0.3
X SPEED BETWEEN 40K - 44K	1,864	0.3
EXCEED PCA .050% - .069%	1,803	0.3
FAIL TO GIVE WAY OR STOP	1,583	0.2
X SPEED BY 45K OR MORE	1,521	0.2
DRV PROB PROH VEH ON HWAY	1,270	0.2
LNR OR PROB DRIVER USING ANY MOB PHONE	1,112	0.2
DRIVE PROB PROHIBITED M/VEH-PROB LIC	1,021	0.2
FAIL TO GIVE RIGHT OF WAY	637	0.1
X 110K SPEED BY 20K - 24K	482	0.1
EXCEED PCA .100% - .109%	457	0.1
EXCEED PCA .110% - .119%	398	0.1
CARELESS DRIVING	329	0
EXCEED PCA BETWEEN .120% - .129%	300	0
EXCEED PCA BETWEEN .130% - .139%	234	0
X SPEED 9K OR LESS H/VEH	226	0
EXCEED PCA BETWEEN .140% - .149%	205	0
DISOBEY YELLOW TRAFFIC LIGHT	178	0
FAIL GIVE WAY WHEN MERGN	135	0
UNLIC NOT VIC L OR P HLDR	114	0
X SPEED 15K - 24K L/VEH	79	0
X SPEED 10K - 14K H/VEH	75	0
X SPEED 10K - 14K L/VEH	62	0
X SPEED 15K - 24K H/VEH	60	0
X SPEED BY 9K OR LESS L/VEH	53	0
FAIL GIVE WAY TO PEDESTRIANS	20	0
X SPEED 25K - 29K L/VEH	7	0
EXCEED SPEED BY 15K OR LESS	4	0
X SPEED 25K - 29K H/VEH	3	0
X SPEED 40K - 44K L/VEH	3	0
X SPEED 30K - 34K L/VEH	2	0
X SPEED 35K - 39K L/VEH	2	0
USE PHONE WHILE DRIVING	1	0
X SPEED 30K - 34K H/VEH	1	0
X SPEED 35K - 39K H/VEH	1	0
Total	669,499	100.0

Table 40: Speed offences

DLS short offence description	Frequency	Percent
X SPEED BY LESS THAN 10K	301,952	60.6
X SPEED BETWEEN 15K - 24K	87,234	17.5
X SPEED BETWEEN 10K - 14K	79,526	15.9
X SPEED BETWEEN 25K - 29K	9,100	1.8
X SPEED BETWEEN 30K - 34K	6,254	1.3
X SPEED BETWEEN 35K - 39K	2,650	0.5
X SPEED BETWEEN 40K - 44K	1,864	0.4
X SPEED BY 45K OR MORE	1,521	0.3
EXCEED SIGNED SPEED LIMIT - 100KPH	931	0.2
EXCEED SIGNED SPEED LIMIT - 60KPH	914	0.2
DRIVE AT A DANGEROUS SPEED	541	0.1
EXCEED SIGNED SPEED LIMIT - 80KPH	536	0.1
EXCEED SPEED LIMIT - SPEED ZONE	504	0.1
X 110K SPEED BY 20K - 24K	482	0.1
EXCEED SIGNED SPEED LIMIT - 70KPH	368	0.1
EXCEED 60 SPEED SIGN-BY 10K LESS 25K	303	0.1
EXCEED SIGNED SPEED LIMIT - 50KPH	243	0.0
X SPEED 9K OR LESS H/VEH	226	0
EXCEED SPEED LIMIT BY 10KPH BUT LESS 25K	200	0
EXCEED DEFAULT SPEED-LIMIT - 100KPH	193	0
EXCEED SIGNED SPEED LIMIT - 110KPH	191	0
EXCEED 100 SPEED LIMIT SIGN-BY LESS 10K	176	0
EXCEED 80 SPEED SIGN-BY 10K LESS 25K	169	0
EXCEED SPEED LIMIT BY 45 KPH OR MORE	168	0
EXCEED SPEED-LIMIT BY LESS THAN 10 KPH	149	0
EXCEED 60 SPEED LIMIT SIGN-BY LESS 10K	138	0
EXCEED 100 SPEED LMT SIGN-BY 45K OR MORE	117	0
EXCEED SPEED-LIMIT BY 45 KPH OR MORE	100	0
EXCEED DEFAULT SPEED-LIMIT - 50KPH	97	0
EXCEED 70 SPEED SIGN-BY 10K LESS 25K	92	0
EXCEED 50 SPEED SIGN-BY 10K LESS 25K	83	0
X SPEED 15K - 24K L/VEH	79	0
EXCEED 80 SPEED LIMT SIGN-BY 45K OR MORE	78	0
EXC 60 SPEED SIGN BY BETWEEN 25 & 35KPH	75	0
X SPEED 10K - 14K H/VEH	75	0
EXCEED 60 SPEEDLIMIT SIGN-BY 45K OR MORE	74	0
EXCEED SIGNED SPEED LIMIT - 40KPH	71	0

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
EXCEED 100 SPEED SIGN-BY 25K LESS 35K	63	0
EXCEED 40 SPEED SIGN-BY 10K LESS 25K	62	0
X SPEED 10K - 14K L/VEH	62	0
X SPEED 15K - 24K H/VEH	60	0
X SPEED BY 9K OR LESS L/VEH	53	0
EXCEED SPEED IN A SPEED-LIMITED AREA	50	0
EXCEED DEFAULT SPEED-LIMIT - 60KPH	48	0
EXCEED SPEED-LIMIT BY 35KPH BUT LESS 45K	48	0
EXCEED 80 SPEED SIGN-BY 35K BUT LESS 45K	46	0
EXCEED 70 SPEED LIMIT SIGN-BY 45K OR MORE	44	0
EXCEED 100 SPEED SIGN-BY 35K & LESS 45K	42	0
EXCEED 80 SPEED SIGN-BY 25K LESS 35K	41	0
DRIVE AT SPEED DANGEROUS-IMPROPER USE MV	40	0
EXCEED 60 SPEED SIGN-BY 35K BUT LESS 45K	39	0
EXCEED 80 SPEED LIMIT SIGN-BY LESS 10K	36	0
EXCEED 50 SPEED LIMIT SIGN-BY LESS 10K	31	0
EXCEED SIGNED SPEED LIMIT - 10KPH	31	0
EXCEED 50 SPEED LIMIT SIGN-BY 45K OR MORE	29	0
EXCEED 70 SPEED SIGN-BY 25K LESS 35K	29	0
EXCEED 50 SPEED SIGN-BY 25K LESS 35K	25	0
EXCEED 70 SPEED LIMIT SIGN-BY LESS 10K	24	0
EXCEED 110 SPEED SIGN-BY 35K& LESS 45K	23	0
EXCEED SIGNED SPEED LIMIT - 90KPH	23	0
EXCEED 40 SPEED SIGN-BY 25K LESS 35K	18	0
EXCEED 110 SPEED LIMIT SIGN-BY LESS 10K	15	0
EXCEED 70 SPEED SIGN-BY 35K BUT LESS 45K	15	0
EXCEED 90 SPEED SIGN-BY 10K LESS 25K	12	0
DRIVE AT EXCESSIVE SPEED	11	0
USE VEH ON HIGHWAY FOR A TRIAL OF SPEED	11	0
EXCEED SPEED IN 40KPH SPEED-LIMITED AREA	10	0
EXCEED 50 SPEED SIGN-BY 35K BUT LESS 45K	9	0
EXCEED SIGNED SPEED LIMIT - 20KPH	9	0
EXCEED 110 SPEED SIGN-BY 25K LESS 35K	7	0
X SPEED 25K - 29K L/VEH	7	0
EXCEED 110 SPEED LMT SIGN-45K OR MORE	4	0
EXCEED 110 SPEED LMT SIGN-BY 45K OR MORE	4	0
EXCEED SPEED BY 15K OR LESS	4	0
EXCEED SPEED-SPEED LTD AREA-10K LESS 25K	4	0

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
EXCEED 40 SPEED LIMIT SIGN-BY LESS 10K	3	0
EXCEED 40 SPEED LIMIT SIGN-BY 45K OR MORE	3	0
EXCEED 40 SPEED SIGN-BY 35K BUT LESS 45K	3	0
EXCEED SPEED-60KPH LTD AREA-10K LESS 25K	3	0
X SPEED 25K - 29K H/VEH	3	0
X SPEED 40K - 44K L/VEH	3	0
EXCEED 110 SPEED LIMIT BY 35 KPH OR MORE	2	0
EXCEED SPEED IN 50KPH SPEED-LIMITED AREA	2	0
HEAVY VEH EXCEED SPEED-LIMIT 10K LESS 25	2	0
X SPEED 30K - 34K L/VEH	2	0
X SPEED 35K - 39K L/VEH	2	0
EXCEED 100K DEFAULT LIMIT-BY 10K LESS 25K	1	0
EXCEED 50K DEFAULT LIMIT-BY 25K LESS 35K	1	0
EXCEED 90 SPEED SIGN-BY 25K LESS 35K	1	0
EXCEED SIGNED SPEED LIMIT - 30KPH	1	0
EXCEED SPEED-60 SPEED LTD AREA-35K</>45K	1	0
EXCEED SPEED-SPEED LTD AREA-BY LESS 10K	1	0
HEAVY VEH EXCEED 100 SIGN-BY LESS 10 KPH	1	0
HEAVY VEH EXCEED 80K SIGN-25K LESS 35K	1	0
SPEED EXCEED 60 KPH IN A 60 KPH ZONE	1	0
SPEED EXCEED 80 KPH IN A 80 KPH ZONE	1	0
X SPEED 30K - 34K H/VEH	1	0
X SPEED 35K - 39K H/VEH	1	0
Total	498,603	100.0

Table 41: Alcohol-related offences

DLS short offence description	Frequency	Percent
HAVE/EXCEED P.C.A WITHIN 3HR BREATH TEST	3,756	27.1
EXCEED PCA .070% - .099%	2,025	14.6
EXCEED PCA .000% - .049%	1,906	13.8
EXCEED PCA .050% - .069%	1,803	13.0
EXCEED PRESC CONCENTRATION OF ALCOHOL	1,159	8.4
EXCEED PCA .100% - .109%	457	3.3
EXCEED PCA .110% - .119%	398	2.9
EXCEED PCA BETWEEN .120% - .129%	300	2.2
HAVE/EXCEED P.C.A WITHIN 3HR BLOOD TEST	290	2.1
REFUSE ACCOMP TO STATION FOR B.TEST	287	2.1
BREACH ALCOHOL INTERLOCK CONDITION	279	2.0

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
EXCEED PCA BETWEEN .130% - .139%	234	1.7
EXCEED PCA BETWEEN .140% - .149%	205	1.5
DRIVE UNDER INFLUENCE OF LIQUOR OR DRUG	204	1.5
REFUSE UNDERGO BREATH TEST	111	0.8
DRV MID RANGE OF BLOOD ALCOHOL CONTENT	98	0.7
REFUSE PRELIMINARY BREATH TEST	90	0.6
DRV LOW RANGE OF BLOOD ALCOHOL CONTENT	59	0.4
REFUSE REMAIN AT STATION FOR B. TEST	30	0.2
DRV HIGH RANGE OF BLOOD ALCOHOL CONTENT	28	0.2
REFUSE UNDERGO FURTHER BREATH TEST	27	0.2
HAVE PRESCRIBED CONCENTRATION 3HRS-BLOOD	19	0.1
BLOOD ALCOHOL CONTENT IN EXCESS OF .08%	14	0.1
FAIL TO STOP AT PBT STATION	14	0.1
DRV SPECIAL RANGE BLOOD ALCOHOL CONTENT	9	0.1
FAIL TO ALLOW DOCTOR TO TAKE BLOOD SAMP	8	0.1
UNDER THE INFLUENCE OF LIQUOR OR DRUG	7	0.1
REFUSE TO ALLOW BLOOD SAMPLE TO BE TAKEN	6	0
DRV NOV RANGE OF BLOOD ALCOHOL CONTENT	5	0
FAIL TO UNDERGO PRELIMINARY BREATH TEST	5	0
ACCOMPANYING DRIVER EXCEED P.C.A. (.00%)	3	0
HAVE PRESCRIBED CONCENTRATION 3HRS BLOOD	3	0
BLOOD ALCOHOL CONTENT IN EXCESS OF .05%	2	0
DRIVE SPECIAL RANGE CONCENTRATION ALCOHO	2	0
AID AND ABET EXC MID RANGE BAC	1	0
CONSUME INTOX LIQ WHLE DRIVING MOTOR VEH	1	0
DRIVE - EXCESS BAC IN SYS	1	0
DRIVE VEH ALCOHOL INTERLOCK DISENGAGED	1	0
DRIVING INSTRUCTOR P.C.A .05% OR ABOVE	1	0
FAIL TO ACCOMPANY TO STATION FOR B TEST	1	0
REFUSE ACCOMP CORP OFFR FOR BLOOD ANALYS	1	0
REFUSE ACCOMP POLICE FOR BLOOD ANALYSIS	1	0
REFUSE REMAIN FOR BLOOD SAMPLE BE TAKEN	1	0
Total	13,852	100.0

Table 42: Other offences

DLS short offence description	Frequency	Percent
DISOBEY TRAFFIC CONTROL SIGNAL	52,888	25.8
DRIVE WITHOUT P PLATES	31,255	15.3
USE HANDHELD MOBILE PHONE WHILE DRIVING	27,929	13.6
S/BELT NOT FASTENED/ADJ	15,851	7.7
DRIVE WHILST AUTHORISATION SUSPENDED	12,079	5.9
PROB FAIL HAVE LIC POSS	9,991	4.9
CARELESS DRIVING	6,791	3.3
DISOBEY TRAFFIC SIGN	6,443	3.1
P1 HOLDER CARRYING MORE THAN 1 PASSENGER	6,353	3.1
FAIL TO OBEY LICENCE COND	4,296	2.1
DRIVE WHILST DISQUALIFIED	3,440	1.7
FOLLOW TOO CLOSELY	3,092	1.5
UNLIC DRV OTHER CIRCUMSTS	2,909	1.4
UNLIC PREV L OR IDP EXP	2,839	1.4
FAIL SEAT BELT ADJ (PASS)	2,821	1.4
DRIVE WITHOUT PLATES DISPLAYED	2,307	1.1
FAIL TO GIVE WAY OR STOP	1,583	0.8
UNLICENSED DRIVING	1,568	0.8
DRIVE IN A DANGEROUS MANNER	1,381	0.7
DRV PROB PROH VEH ON HWAY	1,270	0.6
LNR OR PROB DRIVER USING ANY MOB PHONE	1,140	0.6
DRIVE PROB PROHIBITED M/VEH-PROB LIC	1,023	0.5
CARELESS DRIVING-IMPROPER USE OF VEHICLE	781	0.4
FAILING TO CARRY PROBATIONARY LICENCE	691	0.3
FAIL TO GIVE RIGHT OF WAY	675	0.3
USE HAND HELD MOBILE PHONE-VEH MOVING	657	0.3
FAIL COMPLY WITH CONDITIONS OF LICENCE	438	0.2
CARELESS DRIVING OF A MOTOR VEHICLE	354	0.2
PROB DRIVER DRIVING A PROB PROH VEH	246	0.1
FAIL TO STOP AT STOP SIGN OR LINE	197	0.1
DISOBEY YELLOW TRAFFIC LIGHT	178	0.1
CARELESS IMPR USE OF VEH	160	0.1
DRIVE MANNER DANGEROUS-IMPROPER USE MV	141	0.1
FAIL GIVE WAY WHEN MERGN	135	0.1
FOLLOW TOO CLOSE TO VEHICLE IN FRONT	130	0.1
DRIVE WITHOUT REAR PLATE DISPLAYED	126	0.1
UNLIC NOT VIC L OR P HLDR	114	0.1

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
USE HAND HELD MOBILE PH-VEH STATIONARY	63	0
DRIVE MANNER DANGEROUS CAUSE SERIOUS INJ	55	0
FAIL GIVE WAY WHEN MOVING TO MARKED LANE	50	0
CARELESS DRIVING-IMPROP USE OF MOTOR VEH	42	0
DRIVE WHILE AUTHORISATION CANCELLED	42	0
DRIVE IN BREACH OF PERMIT CONDITION	36	0
DRIVE WITHOUT FRONT PLATE	34	0
FAIL GIVE WAY TO PEDESTRIANS	26	0
FAIL TO GIVE WAY AT INTERSECTION	21	0
FAIL GIVE WAY TO VEHICLE - RIGHT TURN	19	0
PASSENGER FAIL WEAR SEATBELT - OVER 16YR	19	0
FAIL TO GIVE WAY AT T-INTERSECTION	15	0
DRIVE WHILST LICENCE SUSPENDED	14	0
FAIL TAKE/SEND SUSP DRIV LIC PLCE SPECFD	14	0
DRIVE MANNER DANGEROUS CAUSE DEATH	11	0
FAIL GIVE WAY VEH-RIGHT TURN AT INTERSCT	11	0
DRIVE WHILE LIC SUSP-INFRINGEMENTS ACT	10	0
FAIL STOP BEFORE-STOP LINE-YELLOW LIGHT	10	0
PROB DRIVER USE MOBILE PHONE-VEH MOVING	10	0
DRIVE WHILST LICENCE CANCELLED	9	0
FAIL SURRENDER LIC OR PERMIT UPON SUSP	8	0
FAIL TO GIVE WAY TO VEH WHEN TURNING	8	0
DRVE HIGH POWERED M/VEH-PROBATIONARY LIC	7	0
FAIL TO GIVE WAY AT GIVE WAY LINE	6	0
FAIL TO COMPLY NOTICE CANC/SUSP-SPEED	5	0
OBTAIN LICENCE BY FALSE STATEMENT	5	0
P1 PROB DRIVER USE MOB PH-VEH STATIONARY	5	0
FAIL GIVE WAY VEH WHEN MAKING U-TURN	3	0
FAIL TO GIVE WAY FROM ADJACENT LAND	3	0
RIGHT TURNING VEHICLE - FAIL TO GIVE WAY	3	0
DRIVE HIGH POWERED VEH PROB NOT EXPIRED	2	0
FAIL GIVE WAY TO VEHICLE-DIVIDING STRIP	2	0
FAIL GIVE WAY- ENTERING LINE OF TRAFFIC	2	0
FAIL TAKE/SEND CANC DRIV LIC PLCE SPECFD	2	0
FAIL TO STOP AT STOP SIGN	2	0
OBTAIN LICENCE BY MISREPRESENTATION	2	0
DANGEROUS DRIVING	1	0
FAIL COMPLY COND SPECIAL LIC OR PERMIT	1	0

The Victorian Graduated Licensing System: Outcome Evaluation 2017

DLS short offence description	Frequency	Percent
FAIL GIVE WAY TO PED WHILE TURNING	1	0
FAIL GIVE WAY TO PEDESTRIAN ON CROSSING	1	0
FAIL GIVE WAY TO VEH-STOP SIGN/STOP LINE	1	0
FAIL STOP & GIVE WAY AT STOP LINE	1	0
FAIL STOP B/F INTERSECTION-YELLOW LIGHT	1	0
FAIL STOP B/F STOP LNE-YELLOW TRAF ARROW	1	0
FAIL SURRENDER CANCELLED DRIVER LICENCE	1	0
FAIL TO COMPLY NOTICE CANC/SUSP - DRINK	1	0
FAIL TO GIVE WAY TO TRAIN-LEVEL CROSSING	1	0
FAIL TO GIVE WAY TO VEHICLE - LEFT TURN	1	0
FAIL TO GIVE WAY WHEN MERGING	1	0
OBT LIC DURING DISQUALIFICATION PERIOD	1	0
PROB DRIVER DRIVE CORP DEC PROB PROH VEH	1	0
PROB DRIVER DRIVE VEH WITH HIGH POWR MOD	1	0
PROB DRIVER DRIVING A HIGH POWER VEH	1	0
USE PHONE WHILE DRIVING	1	0
Total	204,866	100.0

Appendix C – Driver exclusions (crash analysis)

Drivers were excluded from the crash analyses if they met any of the following criteria:

- gender or date of birth unknown
- date of death earlier than 1/7/2001
- licence status or learner permit status had been continuously expired or unlicensed since before 1/7/2001
- any car licence or permit was surrendered before 1/7/2001
- car licence issued before age 18
- car learner permit issued before age 16 (or before age 17 for permits issued before 1/7/1990)
- motorcycle learner permit or licence issued before car licence
- Victorian car licence issued but no record of a Victorian car learner permit being issued or Victorian car learner permit not held for the applicable minimum period (3, 6, 9 or 12 months) before issue of the car licence
- first Victorian car licence issued was a full licence
- probationary P or P1 or P2 car licence not held for applicable minimum period before graduating to the next higher licence proficiency.

Appendix D – Exposure (driver days by financial year and age) (crash analysis)

Table 43: Exposure by financial year and age

Financial year	Driver age									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
2001/02	11,940,542	16,283,463	18,009,299	18,457,409	18,832,604	19,130,414	46,233,304	56,420,427	102,653,731	144,113,244
2002/03	12,334,130	16,523,001	17,910,965	18,853,367	18,945,723	19,088,406	46,768,096	56,887,496	103,655,592	143,956,908
2003/04	12,916,840	17,050,019	18,252,840	18,853,211	19,440,636	19,291,663	48,219,699	57,585,510	105,805,209	146,091,591
2004/05	12,801,871	17,512,266	18,607,574	19,074,237	19,331,040	19,701,741	48,921,711	58,107,018	107,028,729	147,730,829
2005/06	12,729,690	17,371,385	19,058,290	19,420,987	19,577,303	19,642,920	49,159,365	58,641,210	107,800,575	150,108,392
2006/07	12,751,458	17,437,302	18,946,048	19,866,034	19,885,766	19,865,181	49,134,808	59,616,981	108,751,789	153,143,089
2007/08	13,171,744	17,818,261	19,184,003	19,852,540	20,397,201	20,201,978	50,174,008	60,451,719	110,625,727	155,537,975
2008/09	12,273,904	17,482,392	19,099,126	19,768,406	20,178,858	20,527,499	48,855,422	60,474,763	109,330,185	156,102,509
2009/10	10,683,471	16,574,138	18,671,954	19,719,108	20,214,464	20,425,796	45,929,563	60,359,368	106,288,931	156,740,128
2010/11	10,455,085	15,454,246	18,261,628	19,547,099	20,306,299	20,560,664	44,170,959	60,414,062	104,585,021	156,041,102
2011/12	10,684,960	15,573,232	17,512,638	19,522,707	20,404,206	20,771,386	43,770,830	60,698,299	104,469,129	153,230,813
2012/13	10,894,691	15,603,668	17,566,319	18,909,852	20,461,406	20,836,424	44,064,678	60,207,682	104,272,360	149,566,413
2013/14	10,748,169	15,799,224	17,637,388	19,135,489	20,026,039	21,052,847	44,184,781	60,214,375	104,399,156	146,454,328
Total	154,386,555	216,482,597	238,718,072	250,980,446	258,001,545	261,096,919	609,587,224	770,078,910	1,379,666,134	1,958,817,321

Appendix E – Age at crash involvement time series

**Table 44: Casualty crash involvements by financial year by age at crash and crash involvement rate
(2 tables, rates based on exposure figures in previous appendix)**

Financial year	Crash involvement count									
	Age at crash involvement									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
2001/02	1,069	923	826	723	718	649	2,818	2,090	4,908	2,306
2002/03	1,035	926	769	722	650	614	2,730	1,986	4,716	2,240
2003/04	1,118	942	835	734	620	554	2,895	1,908	4,803	2,210
2004/05	1,060	900	750	684	619	574	2,710	1,877	4,587	2,185
2005/06	857	719	647	583	534	464	2,223	1,581	3,804	1,943
2006/07	703	562	456	440	446	389	1,721	1,275	2,996	1,601
2007/08	721	627	512	477	421	430	1,860	1,328	3,188	1,701
2008/09	661	600	516	457	440	383	1,777	1,280	3,057	1,738
2009/10	592	533	500	442	381	378	1,625	1,201	2,826	1,676
2010/11	542	530	501	458	412	369	1,573	1,239	2,812	1,547
2011/12	526	567	459	524	427	388	1,552	1,339	2,891	1,629
2012/13	488	538	424	455	425	421	1,450	1,301	2,751	1,626
2013/14	492	465	437	421	415	422	1,394	1,258	2,652	1,544
Total	9,864	8,832	7,632	7,120	6,508	6,035	26,328	19,663	45,991	23,946

Financial year	Crash involvement rate per 10,000 driver-years									
	Age at crash involvement									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
2001/02	327.0	207.0	167.5	143.1	139.3	123.9	222.6	135.3	174.6	58.4
2002/03	306.5	204.7	156.8	139.9	125.3	117.5	213.2	127.5	166.2	56.8

Financial year	Crash involvement rate per 10,000 driver-years									
	Age at crash involvement									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
2003/04	316.1	201.8	167.1	142.2	116.5	104.9	219.3	121.0	165.8	55.3
2004/05	302.4	187.7	147.2	131.0	117.0	106.4	202.3	118.0	156.5	54.0
2005/06	245.9	151.2	124.0	109.6	99.6	86.3	165.2	98.5	128.9	47.3
2006/07	201.4	117.7	87.9	80.9	81.9	71.5	127.9	78.1	100.6	38.2
2007/08	199.9	128.5	97.5	87.8	75.4	77.7	135.4	80.2	105.3	39.9
2008/09	196.7	125.4	98.7	84.4	79.6	68.1	132.9	77.3	102.1	40.7
2009/10	202.4	117.5	97.8	81.9	68.8	67.6	129.2	72.7	97.1	39.1
2010/11	189.3	125.3	100.2	85.6	74.1	65.6	130.1	74.9	98.2	36.2
2011/12	179.8	133.0	95.7	98.0	76.4	68.2	129.5	80.6	101.1	38.8
2012/13	163.6	125.9	88.2	87.9	75.9	73.8	120.2	78.9	96.4	39.7
2013/14	167.2	107.5	90.5	80.4	75.7	73.2	115.2	76.3	92.8	38.5
Total	233.4	149.0	116.8	103.6	92.1	84.4	157.8	93.3	121.8	44.7

Table 45: Fatal and serious injury crash involvements by financial year by age at crash and crash involvement rate (2 tables, rates based on exposure figures in previous appendix)

Financial year	Crash involvement count									
	Age at crash involvement									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
2001/02	276	196	205	171	194	155	677	520	1,197	522
2002/03	209	213	171	162	133	142	593	437	1,030	483
2003/04	242	211	198	175	131	137	651	443	1,094	457
2004/05	248	211	179	157	121	121	638	399	1,037	464
2005/06	237	183	169	151	142	116	589	409	998	471
2006/07	218	166	144	137	127	125	528	389	917	410
2007/08	213	188	158	152	123	132	559	407	966	457

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Financial year	Crash involvement count									
	Age at crash involvement									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
2008/09	176	148	173	131	139	111	497	381	878	429
2009/10	152	137	128	116	96	100	417	312	729	407
2010/11	151	155	141	138	115	91	447	344	791	435
2011/12	131	146	133	150	123	109	410	382	792	388
2012/13	128	132	112	125	112	115	372	352	724	393
2013/14	117	127	121	89	102	108	365	299	664	385
Total	2,498	2,213	2,032	1,854	1,658	1,562	6,743	5,074	11,817	5,701

Financial year	Crash involvement rate per 10,000 driver-years									
	Age at crash involvement									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
2001/02	84.4	44.0	41.6	33.8	37.6	29.6	53.5	33.7	42.6	13.2
2002/03	61.9	47.1	34.9	31.4	25.6	27.2	46.3	28.1	36.3	12.3
2003/04	68.4	45.2	39.6	33.9	24.6	25.9	49.3	28.1	37.8	11.4
2004/05	70.8	44.0	35.1	30.1	22.9	22.4	47.6	25.1	35.4	11.5
2005/06	68.0	38.5	32.4	28.4	26.5	21.6	43.8	25.5	33.8	11.5
2006/07	62.4	34.8	27.8	25.2	23.3	23.0	39.2	23.8	30.8	9.8
2007/08	59.1	38.5	30.1	28.0	22.0	23.9	40.7	24.6	31.9	10.7
2008/09	52.4	30.9	33.1	24.2	25.2	19.8	37.2	23.0	29.3	10.0
2009/10	52.0	30.2	25.0	21.5	17.3	17.9	33.2	18.9	25.1	9.5
2010/11	52.8	36.6	28.2	25.8	20.7	16.2	37.0	20.8	27.6	10.2
2011/12	44.8	34.2	27.7	28.1	22.0	19.2	34.2	23.0	27.7	9.2
2012/13	42.9	30.9	23.3	24.1	20.0	20.2	30.8	21.4	25.4	9.6
2013/14	39.8	29.4	25.1	17.0	18.6	18.7	30.2	18.1	23.2	9.6

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Financial year	Crash involvement rate per 10,000 driver-years									
	Age at crash involvement									
	18	19	20	21	22	23	18–20	21–23	18–23	35–42
Total	59.1	37.3	31.1	27.0	23.5	21.9	40.4	24.1	31.3	10.6

Appendix F – Age at crash involvement by gender/ region

Note that the figures in this Appendix do not take into account the Poisson Regression Modelling (PRM) that considers all factors in the model. Therefore, the percentage change figures will not match those in the body of the report where the PRM is used. These tables are included for readers who wish to review the raw data.

Table 46: Casualty crash involvement rate per 10,000 driver-years by age at crash by gender

Gender	Driver group	Age at crash	Crash involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
			Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
Female	Novice	18–20	2,668	1,822	66,569,547	59,041,960	146.4	112.7	-23.0%
		21–23	790	737	33,421,698	31,012,940	86.3	86.8	0.5%
		Total	3,458	2,559	99,991,245	90,054,900	126.3	103.8	-17.8%
	Comparison	35–42	2,529	2,214	221,587,771	220,190,840	41.7	36.7	-11.9%
Male	Novice	18–20	3,597	2,206	74,780,621	66,822,519	175.7	120.6	-31.4%
		21–23	901	689	31,343,278	31,052,615	105.0	81.0	-22.8%
		Total	4,498	2,895	106,123,899	97,875,134	154.8	108.0	-30.2%
	Comparison	35–42	2,950	2,310	212,947,856	210,538,550	50.6	40.1	-20.8%
Total	Novice	18–20	6,265	4,028	141,350,168	125,864,479	161.9	116.9	-27.8%
		21–23	1,691	1,426	64,764,976	62,065,555	95.4	83.9	-12.0%
		Total	7,956	5,454	206,115,144	187,930,034	141.0	106.0	-24.8%
	Comparison	35–42	5,479	4,524	434,535,627	430,729,390	46.1	38.4	-16.7%

Table 47:FSI crash involvement rate per 10,000 driver-years by age at crash by gender

Gender	Driver group	Age at crash	Crash involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
			Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
Female	Novice	18–20	629	404	66,569,547	59,041,960	34.5	25.0	–27.6%
		21–23	187	174	33,421,698	31,012,940	20.4	20.5	0.3%
		Total	816	578	99,991,245	90,054,900	29.8	23.4	–21.4%
	Comparison	35–42	530	494	221,587,771	220,190,840	8.7	8.2	–6.2%
Male	Novice	18–20	1,018	618	74,780,621	66,822,519	49.7	33.8	–32.1%
		21–23	277	173	31,343,278	31,052,615	32.3	20.3	–37.0%
		Total	1,295	791	106,123,899	97,875,134	44.6	29.5	–33.8%
	Comparison	35–42	753	611	212,947,856	210,538,550	12.9	10.6	–17.9%
Total	Novice	18–20	1,647	1,022	141,350,168	125,864,479	42.6	29.7	–30.3%
		21–23	464	347	64,764,976	62,065,555	26.2	20.4	–22.0%
		Total	2,111	1,369	206,115,144	187,930,034	37.4	26.6	–28.9%
	Comparison	35–42	1,283	1,105	434,535,627	430,729,390	10.8	9.4	–13.1%

Table 48: Casualty crash involvement rate per 10,000 driver-years by crash location

Crash location	Driver group	Age at crash	Crash involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
			Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
Metro	Novice	18–20	4,500	2,768	141,350,168	125,864,479	116.3	80.3	–30.9%
		21–23	1,333	1,097	64,764,976	62,065,555	75.2	64.6	–14.1%
		Total	5,833	3,865	206,115,144	187,930,034	103.4	75.1	–27.3%
	Comparison	35–42	4,298	3,539	434,535,627	430,729,390	36.1	30.0	–16.9%
Country	Novice	18–20	1,750	1,253	141,350,168	125,864,479	45.2	36.4	–19.6%
		21–23	356	326	64,764,976	62,065,555	20.1	19.2	–4.4%
		Total	2,106	1,579	206,115,144	187,930,034	37.3	30.7	–17.8%
	Comparison	35–42	1,169	980	434,535,627	430,729,390	9.8	8.3	–15.4%
Unknown	Novice	18–20	15	7	141,350,168	125,864,479	0.4	0.2	–47.6%
		21–23	2	3	64,764,976	62,065,555	0.1	0.2	56.5%
		Total	17	10	206,115,144	187,930,034	0.3	0.2	–35.5%
	Comparison	35–42	12	5	434,535,627	430,729,390	0.1	0.0	–58.0%
Total	Novice	18–20	6,265	4,028	141,350,168	125,864,479	161.9	116.9	–27.8%
		21–23	1,691	1,426	64,764,976	62,065,555	95.4	83.9	–12.0%
		Total	7,956	5,454	206,115,144	187,930,034	141.0	106.0	–24.8%
	Comparison	35–42	5,479	4,524	434,535,627	430,729,390	46.1	38.4	–16.7%

Table 49:FSI crash involvement rate per 10,000 driver-years by crash location

Crash location	Driver group	Age at crash	Crash involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
			Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
Metro	Novice	18–20	1,132	693	141,350,168	125,864,479	29.3	20.1	–31.2%
		21–23	373	257	64,764,976	62,065,555	21.0	15.1	–28.1%
		Total	1,505	950	206,115,144	187,930,034	26.7	18.5	–30.8%
	Comparison	35–42	983	813	434,535,627	430,729,390	8.3	6.9	–16.6%
Country	Novice	18–20	509	327	141,350,168	125,864,479	13.2	9.5	–27.9%
		21–23	91	90	64,764,976	62,065,555	5.1	5.3	3.2%
		Total	600	417	206,115,144	187,930,034	10.6	8.1	–23.8%
	Comparison	35–42	296	292	434,535,627	430,729,390	2.5	2.5	–0.5%
Unknown	Novice	18–20	6	2	141,350,168	125,864,479	0.2	0.1	–62.6%
		21–23	0	0	64,764,976	62,065,555	0.0	0.0	N/A
		Total	6	2	206,115,144	187,930,034	0.1	0.0	–63.4%
	Comparison	35–42	4	0	434,535,627	430,729,390	0.0	0.0	–100.0%
Total	Novice	18–20	1,647	1,022	141,350,168	125,864,479	42.6	29.7	–30.3%
		21–23	464	347	64,764,976	62,065,555	26.2	20.4	–22.0%
		Total	2,111	1,369	206,115,144	187,930,034	37.4	26.6	–28.9%
	Comparison	35–42	1,283	1,105	434,535,627	430,729,390	10.8	9.4	–13.1%

Appendix G – Time since first licence issue (experience) additional results

Note that the figures in this Appendix do not take into account the Poisson Regression Modelling (PRM) that considers all factors in the model. Therefore, the percentage change figures will not match those in the body of the report where the PRM is used. Also, the choice of study period and restrictions on driver membership have resulted in an under-representation of drivers who have held their licence longer – sample sizes were greatest for drivers in their first year of driving and became progressively smaller as experience increased. These tables are included for readers who wish to review the raw data.

Table 50: Casualty crash involvement rate per 10,000 driver-years by gender by licence issue age by years since licence issue

Gender	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
Female	18–20	Novice	0	1,525	988	28,540,965	26,478,145	195.2	136.3	–30.2%
			1	883	724	28,095,439	24,996,692	114.8	105.8	–7.8%
			2	599	402	22,585,453	18,870,189	96.9	77.8	–19.7%
			3	256	219	13,042,781	10,192,206	71.7	78.5	9.5%
			Total	3,263	2,333	92,264,638	80,537,232	129.2	105.8	–18.1%
		Comparison	12–18	2,222	1,659	190,906,208	165,693,288	42.5	36.6	–14.0%
	21–23	Novice	0	98	113	2,746,465	4,439,400	130.3	93.0	–28.7%
			1	62	75	2,326,199	3,146,992	97.3	87.0	–10.6%
			2	39	45	1,637,204	1,846,206	87.0	89.0	2.3%
			3	16	17	846,953	800,874	69.0	77.5	12.4%
			Total	215	250	7,556,821	10,233,472	103.9	89.2	–14.1%
		Comparison	12–18	262	217	18,087,197	17,988,807	52.9	44.1	–16.7%

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Gender	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
	Total	Novice	0	1,623	1,101	31,287,430	30,917,545	189.5	130.1	-31.4%
			1	945	799	30,421,638	28,143,684	113.5	103.7	-8.6%
			2	638	447	24,222,657	20,716,395	96.2	78.8	-18.1%
			3	272	236	13,889,734	10,993,080	71.5	78.4	9.6%
			Total	3,478	2,583	99,821,459	90,770,704	127.3	103.9	-18.3%
		Comparison	12-18	2,484	1,876	208,993,405	183,682,095	43.4	37.3	-14.1%
Male	18-20	Novice	0	2,007	1,172	30,568,545	28,635,294	239.8	149.5	-37.7%
			1	1,199	778	30,018,182	27,525,504	145.9	103.2	-29.2%
			2	715	487	24,282,160	21,237,373	107.5	83.8	-22.1%
			3	330	227	14,161,150	11,758,526	85.1	70.5	-17.2%
			Total	4,251	2,664	99,030,037	89,156,697	156.8	109.1	-30.4%
		Comparison	12-18	2,902	1,958	188,685,947	168,493,295	56.2	42.4	-24.4%
	21-23	Novice	0	96	115	1,924,373	3,438,496	182.2	122.2	-33.0%
			1	63	68	1,672,410	2,479,297	137.6	100.2	-27.2%
			2	35	38	1,206,568	1,494,921	106.0	92.8	-12.4%
			3	10	11	639,103	689,770	57.2	58.2	1.9%
			Total	204	232	5,442,454	8,102,484	136.9	104.6	-23.6%
		Comparison	12-18	156	134	9,311,833	10,867,714	61.2	45.0	-26.4%
	Total	Novice	0	2,103	1,287	32,492,918	32,073,790	236.4	146.6	-38.0%
			1	1,262	846	31,690,592	30,004,801	145.5	103.0	-29.2%
			2	750	525	25,488,728	22,732,294	107.5	84.4	-21.5%
			3	340	238	14,800,253	12,448,296	83.9	69.8	-16.8%
			Total	4,455	2,896	104,472,491	97,259,181	155.8	108.8	-30.2%
		Comparison	12-18	3,058	2,092	197,997,780	179,361,009	56.4	42.6	-24.5%
Total	18-20	Novice	0	3,532	2,160	59,109,510	55,113,439	218.2	143.1	-34.4%
			1	2,082	1,502	58,113,621	52,522,196	130.9	104.5	-20.2%

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Gender	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
	21-23		2	1,314	889	46,867,613	40,107,562	102.4	81.0	-20.9%
			3	586	446	27,203,931	21,950,732	78.7	74.2	-5.7%
			Total	7,514	4,997	191,294,675	169,693,929	143.5	107.6	-25.0%
		Comparison	12-18	5,124	3,617	379,592,155	334,186,583	49.3	39.5	-19.8%
		Novice	0	194	228	4,670,838	7,877,896	151.7	105.7	-30.3%
			1	125	143	3,998,609	5,626,289	114.2	92.8	-18.7%
			2	74	83	2,843,772	3,341,127	95.0	90.7	-4.5%
			3	26	28	1,486,056	1,490,644	63.9	68.6	7.4%
			Total	419	482	12,999,275	18,335,956	117.7	96.0	-18.4%
	Comparison	12-18	418	351	27,399,030	28,856,521	55.7	44.4	-20.3%	
	Total	Novice	0	3,726	2,388	63,780,348	62,991,335	213.4	138.5	-35.1%
			1	2,207	1,645	62,112,230	58,148,485	129.8	103.3	-20.4%
			2	1,388	972	49,711,385	43,448,689	102.0	81.7	-19.9%
			3	612	474	28,689,987	23,441,376	77.9	73.9	-5.2%
			Total	7,933	5,479	204,293,950	188,029,885	141.8	106.4	-25.0%
		Comparison	12-18	5,542	3,968	406,991,185	363,043,104	49.7	39.9	-19.7%

Table 51: Fatal and serious injury crash involvement rate per 10,000 driver-years by gender by licence issue age by years since licence issue

Gender	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years			
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change	
Female	18–20	Novice	0	373	218	28,540,965	26,478,145	47.7	30.1	–37.0%	
			1	202	152	28,095,439	24,996,692	26.3	22.2	–15.4%	
			2	145	94	22,585,453	18,870,189	23.4	18.2	–22.4%	
			3	63	58	13,042,781	10,192,206	17.6	20.8	17.8%	
			Total	783	522	92,264,638	80,537,232	31.0	23.7	–23.6%	
		Comparison	12–18	525	364	190,906,208	165,693,288	10.0	8.0	–20.1%	
	21–23	Novice	0	19	30	2,746,465	4,439,400	25.3	24.7	–2.3%	
			1	13	20	2,326,199	3,146,992	20.4	23.2	13.7%	
			2	6	13	1,637,204	1,846,206	13.4	25.7	92.1%	
			3	10	5	846,953	800,874	43.1	22.8	–47.1%	
			Total	48	68	7,556,821	10,233,472	23.2	24.3	4.6%	
		Comparison	12–18	55	41	18,087,197	17,988,807	11.1	8.3	–25.0%	
	Total	Novice	0	392	248	31,287,430	30,917,545	45.8	29.3	–36.0%	
			1	215	172	30,421,638	28,143,684	25.8	22.3	–13.5%	
			2	151	107	24,222,657	20,716,395	22.8	18.9	–17.1%	
			3	73	63	13,889,734	10,993,080	19.2	20.9	9.0%	
			Total	831	590	99,821,459	90,770,704	30.4	23.7	–21.9%	
		Comparison	12–18	580	405	208,993,405	183,682,095	10.1	8.1	–20.6%	
	Male	18–20	Novice	0	568	327	30,568,545	28,635,294	67.9	41.7	–38.5%
				1	329	226	30,018,182	27,525,504	40.0	30.0	–25.1%
2				208	120	24,282,160	21,237,373	31.3	20.6	–34.0%	
3				108	57	14,161,150	11,758,526	27.9	17.7	–36.4%	
Total				1,213	730	99,030,037	89,156,697	44.7	29.9	–33.2%	
Comparison			12–18	746	515	188,685,947	168,493,295	14.4	11.2	–22.7%	

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Gender	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years			
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change	
	21–23	Novice	0	25	33	1,924,373	3,438,496	47.5	35.1	–26.1%	
			1	24	18	1,672,410	2,479,297	52.4	26.5	–49.4%	
			2	16	6	1,206,568	1,494,921	48.4	14.7	–69.7%	
			3	4		639,103	689,770	22.9	0.0	–100.0%	
			Total	69	57	5,442,454	8,102,484	46.3	25.7	–44.5%	
			Comparison	12–18	41	34	9,311,833	10,867,714	16.1	11.4	–28.9%
	Total	Novice	0	593	360	32,492,918	32,073,790	66.7	41.0	–38.5%	
			1	353	244	31,690,592	30,004,801	40.7	29.7	–27.0%	
			2	224	126	25,488,728	22,732,294	32.1	20.2	–36.9%	
			3	112	57	14,800,253	12,448,296	27.6	16.7	–39.5%	
			Total	1,282	787	104,472,491	97,259,181	44.8	29.6	–34.1%	
			Comparison	12–18	787	549	197,997,780	179,361,009	14.5	11.2	–23.0%
	Total	18–20	Novice	0	941	545	59,109,510	55,113,439	58.1	36.1	–37.9%
				1	531	378	58,113,621	52,522,196	33.4	26.3	–21.2%
2				353	214	46,867,613	40,107,562	27.5	19.5	–29.2%	
3				171	115	27,203,931	21,950,732	23.0	19.1	–16.7%	
Total				1,996	1,252	191,294,675	169,693,929	38.1	26.9	–29.3%	
			Comparison	12–18	1,271	879	379,592,155	334,186,583	12.2	9.6	–21.4%
21–23		Novice	0	44	63	4,670,838	7,877,896	34.4	29.2	–15.1%	
			1	37	38	3,998,609	5,626,289	33.8	24.7	–27.0%	
			2	22	19	2,843,772	3,341,127	28.3	20.8	–26.5%	
			3	14	5	1,486,056	1,490,644	34.4	12.3	–64.4%	
			Total	117	125	12,999,275	18,335,956	32.9	24.9	–24.3%	
			Comparison	12–18	96	75	27,399,030	28,856,521	12.8	9.5	–25.8%
Total		Novice	0	985	608	63,780,348	62,991,335	56.4	35.3	–37.5%	
			1	568	416	62,112,230	58,148,485	33.4	26.1	–21.8%	

Gender	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
			2	375	233	49,711,385	43,448,689	27.6	19.6	-28.9%
			3	185	120	28,689,987	23,441,376	23.6	18.7	-20.6%
			Total	2,113	1,377	204,293,950	188,029,885	37.8	26.7	-29.2%
		Comparison	12-18	1,367	954	406,991,185	363,043,104	12.3	9.6	-21.8%

Table 52: Casualty crash involvement rate per 10,000 driver-years by crash location by licence issue age by years since licence issue

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
Metro	18-20	Novice	0	2,482	1,467	59,109,510	55,113,439	153.4	97.2	-36.6%
			1	1,550	1,065	58,113,621	52,522,196	97.4	74.1	-24.0%
			2	1,002	645	46,867,613	40,107,562	78.1	58.7	-24.8%
			3	444	346	27,203,931	21,950,732	59.6	57.6	-3.4%
			Total	5,478	3,523	191,294,675	169,693,929	104.6	75.8	-27.5%
		Comparison	12-18	4,096	2,832	379,592,155	334,186,583	39.4	31.0	-21.5%
	21-23	Novice	0	157	172	4,670,838	7,877,896	122.8	79.7	-35.0%
			1	104	117	3,998,609	5,626,289	95.0	76.0	-20.0%
			2	62	67	2,843,772	3,341,127	79.6	73.2	-8.0%
			3	23	22	1,486,056	1,490,644	56.5	53.9	-4.6%
			Total	346	378	12,999,275	18,335,956	97.2	75.3	-22.5%
		Comparison	12-18	348	289	27,399,030	28,856,521	46.4	36.6	-21.1%
	Total	Novice	0	2,639	1,639	63,780,348	62,991,335	151.1	95.0	-37.1%
			1	1,654	1,182	62,112,230	58,148,485	97.3	74.2	-23.7%
			2	1,064	712	49,711,385	43,448,689	78.2	59.9	-23.4%
3			467	368	28,689,987	23,441,376	59.5	57.3	-3.6%	
Total			5,824	3,901	204,293,950	188,029,885	104.1	75.8	-27.2%	

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years			
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change	
		Comparison	12–18	4,444	3,121	406,991,185	363,043,104	39.9	31.4	-21.3%	
Country	18–20	Novice	0	1,046	688	59,109,510	55,113,439	64.6	45.6	-29.5%	
			1	523	434	58,113,621	52,522,196	32.9	30.2	-8.2%	
			2	308	244	46,867,613	40,107,562	24.0	22.2	-7.4%	
			3	142	100	27,203,931	21,950,732	19.1	16.6	-12.7%	
			Total	2,019	1,466	191,294,675	169,693,929	38.5	31.6	-18.1%	
			Comparison	12–18	1,016	777	379,592,155	334,186,583	9.8	8.5	-13.1%
	21–23	Novice	0	37	54	4,670,838	7,877,896	28.9	25.0	-13.5%	
			1	21	26	3,998,609	5,626,289	19.2	16.9	-12.0%	
			2	12	15	2,843,772	3,341,127	15.4	16.4	6.4%	
			3	3	6	1,486,056	1,490,644	7.4	14.7	99.4%	
			Total	73	101	12,999,275	18,335,956	20.5	20.1	-1.9%	
			Comparison	12–18	70	62	27,399,030	28,856,521	9.3	7.8	-15.9%
	Total	Novice	0	1,083	742	63,780,348	62,991,335	62.0	43.0	-30.6%	
			1	544	460	62,112,230	58,148,485	32.0	28.9	-9.7%	
2			320	259	49,711,385	43,448,689	23.5	21.8	-7.4%		
3			145	106	28,689,987	23,441,376	18.5	16.5	-10.5%		
Total			2,092	1,567	204,293,950	188,029,885	37.4	30.4	-18.6%		
			Comparison	12–18	1,086	839	406,991,185	363,043,104	9.7	8.4	-13.4%
Unknown	18–20	Novice	0	4	5	59,109,510	55,113,439	0.2	0.3	34.1%	
			1	9	3	58,113,621	52,522,196	0.6	0.2	-63.1%	
			2	4	0	46,867,613	40,107,562	0.3	0.0	-100.0%	
			3	0	0	27,203,931	21,950,732	0.0	0.0	N/A	
			Total	17	8	191,294,675	169,693,929	0.3	0.2	-47.0%	
			Comparison	12–18	12	8	379,592,155	334,186,583	0.1	0.1	-24.3%
	21–23	Novice	0	0	2	4,670,838	7,877,896	0.0	0.9	N/A	

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years			
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change	
			1	0	0	3,998,609	5,626,289	0.0	0.0	N/A	
			2	0	1	2,843,772	3,341,127	0.0	1.1	N/A	
			3	0	0	1,486,056	1,490,644	0.0	0.0	N/A	
			Total	0	3	12,999,275	18,335,956	0.0	0.6	N/A	
		Comparison	12-18	0	0	27,399,030	28,856,521	0.0	0.0	N/A	
	Total	Novice	0	4	7	63,780,348	62,991,335	0.2	0.4	77.2%	
			1	9	3	62,112,230	58,148,485	0.5	0.2	-64.4%	
			2	4	1	49,711,385	43,448,689	0.3	0.1	-71.4%	
			3	0	0	28,689,987	23,441,376	0.0	0.0	N/A	
			Total	17	11	204,293,950	188,029,885	0.3	0.2	-29.7%	
	Comparison	12-18	12	8	406,991,185	363,043,104	0.1	0.1	-25.3%		
	Total	18-20	Novice	0	3,532	2,160	59,109,510	55,113,439	218.2	143.1	-34.4%
				1	2,082	1,502	58,113,621	52,522,196	130.9	104.5	-20.2%
				2	1,314	889	46,867,613	40,107,562	102.4	81.0	-20.9%
3				586	446	27,203,931	21,950,732	78.7	74.2	-5.7%	
Total				7,514	4,997	191,294,675	169,693,929	143.5	107.6	-25.0%	
Comparison			12-18	5,124	3,617	379,592,155	334,186,583	49.3	39.5	-19.8%	
21-23		Novice	0	194	228	4,670,838	7,877,896	151.7	105.7	-30.3%	
			1	125	143	3,998,609	5,626,289	114.2	92.8	-18.7%	
			2	74	83	2,843,772	3,341,127	95.0	90.7	-4.5%	
			3	26	28	1,486,056	1,490,644	63.9	68.6	7.4%	
			Total	419	482	12,999,275	18,335,956	117.7	96.0	-18.4%	
		Comparison	12-18	418	351	27,399,030	28,856,521	55.7	44.4	-20.3%	
Total		Novice	0	3,726	2,388	63,780,348	62,991,335	213.4	138.5	-35.1%	
			1	2,207	1,645	62,112,230	58,148,485	129.8	103.3	-20.4%	
			2	1,388	972	49,711,385	43,448,689	102.0	81.7	-19.9%	

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
			3	612	474	28,689,987	23,441,376	77.9	73.9	-5.2%
			Total	7,933	5,479	204,293,950	188,029,885	141.8	106.4	-25.0%
		Comparison	12-18	5,542	3,968	406,991,185	363,043,104	49.7	39.9	-19.7%

Table 53: Fatal and serious injury crash involvement rate per 10,000 driver-years by crash location by licence issue age by years since licence issue

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
Metro	18-20	Novice	0	618	358	59,109,510	55,113,439	38.2	23.7	-37.9%
			1	394	265	58,113,621	52,522,196	24.8	18.4	-25.6%
			2	264	159	46,867,613	40,107,562	20.6	14.5	-29.6%
			3	132	89	27,203,931	21,950,732	17.7	14.8	-16.4%
			Total	1,408	871	191,294,675	169,693,929	26.9	18.7	-30.3%
		Comparison	12-18	987	650	379,592,155	334,186,583	9.5	7.1	-25.2%
	21-23	Novice	0	35	42	4,670,838	7,877,896	27.4	19.5	-28.9%
			1	30	32	3,998,609	5,626,289	27.4	20.8	-24.2%
			2	16	12	2,843,772	3,341,127	20.6	13.1	-36.2%
			3	13	4	1,486,056	1,490,644	32.0	9.8	-69.3%
			Total	94	90	12,999,275	18,335,956	26.4	17.9	-32.1%
		Comparison	12-18	80	60	27,399,030	28,856,521	10.7	7.6	-28.8%
	Total	Novice	0	653	400	63,780,348	62,991,335	37.4	23.2	-38.0%
			1	424	297	62,112,230	58,148,485	24.9	18.7	-25.2%
			2	280	171	49,711,385	43,448,689	20.6	14.4	-30.1%
			3	145	93	28,689,987	23,441,376	18.5	14.5	-21.5%
			Total	1,502	961	204,293,950	188,029,885	26.9	18.7	-30.5%

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years			
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change	
		Comparison	12–18	1,067	710	406,991,185	363,043,104	9.6	7.1	-25.4%	
Country	18–20	Novice	0	321	185	59,109,510	55,113,439	19.8	12.3	-38.2%	
			1	134	113	58,113,621	52,522,196	8.4	7.9	-6.7%	
			2	88	55	46,867,613	40,107,562	6.9	5.0	-27.0%	
			3	39	26	27,203,931	21,950,732	5.2	4.3	-17.4%	
			Total	582	379	191,294,675	169,693,929	11.1	8.2	-26.6%	
			Comparison	12–18	281	227	379,592,155	334,186,583	2.7	2.5	-8.2%
	21–23	Novice	0	9	21	4,670,838	7,877,896	7.0	9.7	38.3%	
			1	7	6	3,998,609	5,626,289	6.4	3.9	-39.1%	
			2	6	7	2,843,772	3,341,127	7.7	7.7	-0.7%	
			3	1	1	1,486,056	1,490,644	2.5	2.5	-0.3%	
			Total	23	35	12,999,275	18,335,956	6.5	7.0	7.9%	
			Comparison	12–18	16	15	27,399,030	28,856,521	2.1	1.9	-11.0%
	Total	Novice	0	330	206	63,780,348	62,991,335	18.9	11.9	-36.8%	
			1	141	119	62,112,230	58,148,485	8.3	7.5	-9.8%	
			2	94	62	49,711,385	43,448,689	6.9	5.2	-24.5%	
3			40	27	28,689,987	23,441,376	5.1	4.2	-17.4%		
Total			605	414	204,293,950	188,029,885	10.8	8.0	-25.7%		
			Comparison	12–18	297	242	406,991,185	363,043,104	2.7	2.4	-8.7%
Unknown	18–20	Novice	0	2	2	59,109,510	55,113,439	0.1	0.1	7.3%	
			1	3	0	58,113,621	52,522,196	0.2	0.0	-100.0%	
			2	1	0	46,867,613	40,107,562	0.1	0.0	-100.0%	
			3	0	0	27,203,931	21,950,732	0.0	0.0	N/A	
			Total	6	2	191,294,675	169,693,929	0.1	0.0	-62.4%	
			Comparison	12–18	3	2	379,592,155	334,186,583	0.0	0.0	-24.3%
	21–23	Novice	0	0	0	4,670,838	7,877,896	0.0	0.0	N/A	

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years						
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change				
			1	0	0	3,998,609	5,626,289	0.0	0.0	N/A				
			2	0	0	2,843,772	3,341,127	0.0	0.0	N/A				
			3	0	0	1,486,056	1,490,644	0.0	0.0	N/A				
			Total	0	0	12,999,275	18,335,956	0.0	0.0	N/A				
		Total	Novice	Comparison	12-18	0	0	27,399,030	28,856,521	0.0	0.0	N/A		
				0	2	2	63,780,348	62,991,335	0.1	0.1	1.3%			
				1	3	0	62,112,230	58,148,485	0.2	0.0	-100.0%			
				2	1	0	49,711,385	43,448,689	0.1	0.0	-100.0%			
				3	0	0	28,689,987	23,441,376	0.0	0.0	N/A			
				Total	6	2	204,293,950	188,029,885	0.1	0.0	-63.8%			
				Comparison	12-18	3	2	406,991,185	363,043,104	0.0	0.0	-25.3%		
				Total	18-20	Novice	0	941	545	59,109,510	55,113,439	58.1	36.1	-37.9%
							1	531	378	58,113,621	52,522,196	33.4	26.3	-21.2%
							2	353	214	46,867,613	40,107,562	27.5	19.5	-29.2%
3	171	115	27,203,931				21,950,732	23.0	19.1	-16.7%				
Total	1,996	1,252	191,294,675				169,693,929	38.1	26.9	-29.3%				
21-23	Novice	Comparison	12-18		1,271	879	379,592,155	334,186,583	12.2	9.6	-21.4%			
		0	44		63	4,670,838	7,877,896	34.4	29.2	-15.1%				
		1	37		38	3,998,609	5,626,289	33.8	24.7	-27.0%				
		2	22		19	2,843,772	3,341,127	28.3	20.8	-26.5%				
		3	14		5	1,486,056	1,490,644	34.4	12.3	-64.4%				
Total	117	125	12,999,275	18,335,956	32.9	24.9	-24.3%							
Comparison	12-18	96	75	27,399,030	28,856,521	12.8	9.5	-25.8%						
Total	Novice	0	985	608	63,780,348	62,991,335	56.4	35.3	-37.5%					
		1	568	416	62,112,230	58,148,485	33.4	26.1	-21.8%					
		2	375	233	49,711,385	43,448,689	27.6	19.6	-28.9%					

The Victorian Graduated Licensing System: Outcome Evaluation 2017

Crash location	Licence issue age	Driver group	Experience (years)	Involvement count		Exposure (driver-days)		Involvement rate per 10,000 driver-years		
				Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Pre-GLS	Post-GLS	Change
			3	185	120	28,689,987	23,441,376	23.6	18.7	-20.6%
			Total	2,113	1,377	204,293,950	188,029,885	37.8	26.7	-29.2%
		Comparison	12-18	1,367	954	406,991,185	363,043,104	12.3	9.6	-21.8%

For further information
please phone **13 11 71** or visit
vicroads.vic.gov.au

