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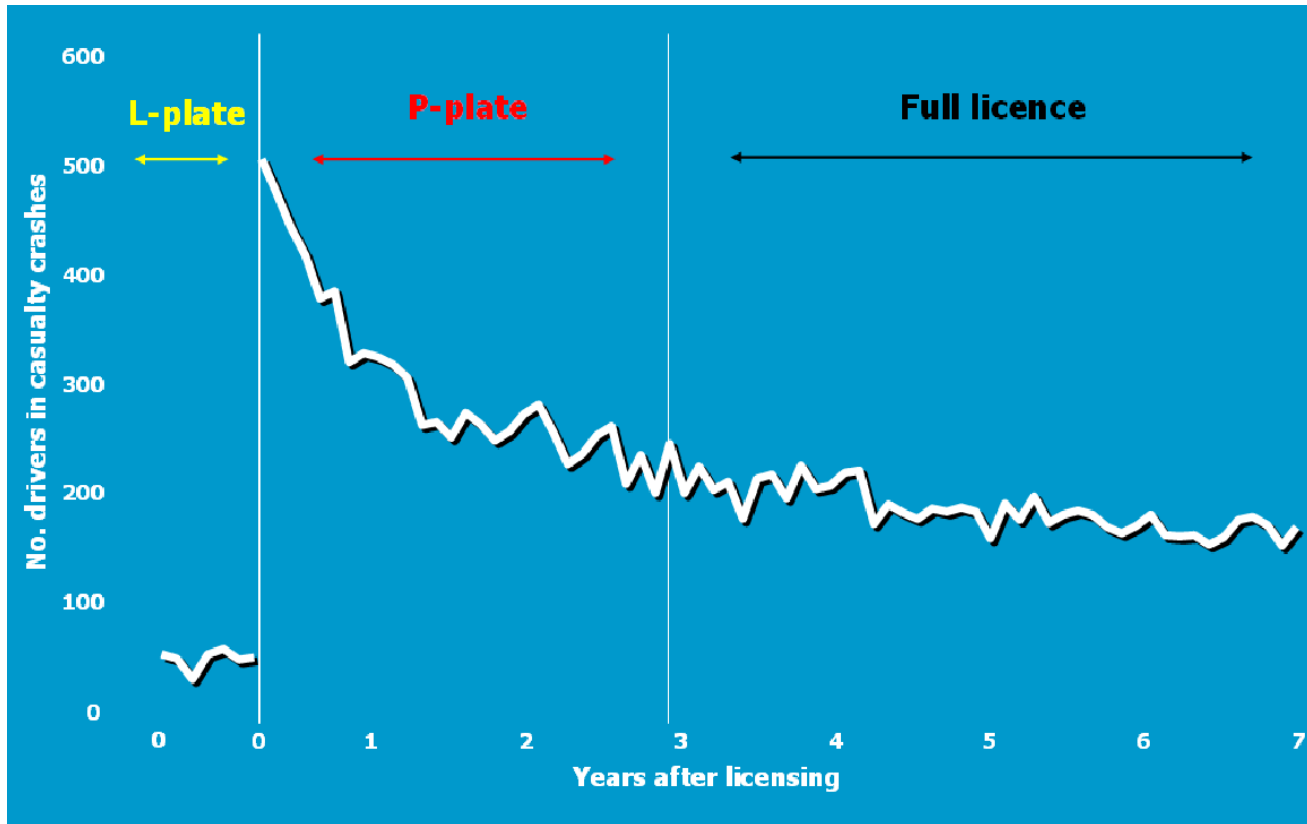
A centre within the Monash University Injury Research Institute

# Evaluation of Queensland's New Graduated Licensing System

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# QLD crash frequency by licence phase



(Source: Queensland Transport (2007) Learner Driver Handbook)

# The New Queensland GLS

- Introduced on July 1<sup>st</sup> 2007
- First major change since 1999
- 13 major initiatives

# Major Initiatives of New GLS

- Reducing the minimum age to obtain a Learner licence
- Increasing the minimum Learner period
- Logbook for gaining driving experience
- Restricting mobile phone use among drivers
- Restricting loudspeaker devices among passengers
- Requiring that motorbike Learners hold a car licence
- Two phase intermediate (probationary) licence system
- Compulsory L-plates and P-plates
- Peer-passenger restrictions
- High-powered vehicle restriction
- Late-night driving restriction for disqualified or suspended drivers
- Media package and educational tools
- Hazard Perception Test for P1 licence holders before applying for P2 licence

# Aims & Levels of Analysis

- **Aim:** to assess the net effect of the new GLS on police reported crash frequency by severity
- **Levels of analysis**
  - **Overall assessment of the GLS:**
    - Overall program: including old GLS carryover:
    - Overall program: only new GLS:
  - **Assessment of new GLS by licence type:** (L, P1, P2 and Open)
  - **Assessment of the new GLS by pre-defined treatment groups**
  - **Assessment of the new GLS by Treatment Group 1 (progressed through all stages under new GLS conditions):**

# Treatment Groups Defined by GLS Path

	Description of defining characteristics of each group
1	Licence activity new GLS; obtained Ls aged under 22; P1 under 23; P2 under 25;
2	Licence activity new GLS; obtained Ls aged under 23; P1 aged 23; P2 between 24-25; age-based exemptions P2 hold 1 year only
3	Licence activity new GLS; obtained Ls aged under 24; P1 aged 24; age-based exemptions no P2 phase
4	Licence activity new GLS; obtained Ls aged under 25 years; P2 aged 25 years; age-based exemptions no P1 phase; age-based exemptions on the P2 period: only hold P2 for 1 year, exempt from the HPV restriction, and late night driving restriction as penalty for exceeding demerit point threshold
5	Licence activity new GLS; obtained Ls aged 25 years or over; P2 aged 25 years or above age-based exemptions no P1 phase; age-based exemptions on the Learner period: logbook is voluntary and no mobile phone restriction P2 period: only hold P2 for 1 year, exempt from the HPV restriction, and late night driving restriction as penalty for exceeding demerit point threshold.
6	Licence activity new GLS; obtained Ls but have no progressed beyond this licence phase
7	Licence activity old and new GLS; Learners on old system aged 16.5 – 23 years; P1 aged under 23 years; P2 under 25 In new GLS subject to the same requirements and restrictions as drivers in Treatment Group 1
8	Licence activity old and new GLS; Learners on old system aged 16.5 – 24 years; P1 aged 24 years; aged-based exemptions no P2 phase In new GLS period are therefore subject to the same requirements and restrictions as Treatment Group 3
9	Licence activity old and new GLS; Learners on old system aged 16.5+; P2 aged 25 years or above; age-based exemptions no P1 phase; age-based exemptions on the P2 period: only hold P2 for 1 year, exempt from the HPV restriction, and late night driving restriction as penalty for exceeding demerit point threshold.  In new GLS period are therefore subject to the same requirements and restrictions as Treatment Group 4
10	Licence activity old GLS; obtained Ls but have no progressed beyond this licence phase

# License Condition by Treatment Group

TG	L (Old GLS)	L (New GLS)	P1	P2
1		12-month minimum holding period; L plates; Logbook supervised 100 hours; Mobile phone restriction; Zero BAC	12-month minimum holding period; Red P plates; Peer passenger restriction; Mobile phone restriction; High powered vehicle restriction; Zero BAC; Late night driving restriction as penalty for accumulating 4+ demerit points; HPT to progress to next phase	24-month holding period; High powered vehicle restriction; Zero BAC; Late night driving restriction as penalty for accumulating 4+ demerit points
2		As above	As above	As above except 12-month holding period
3		As above	As above	No P2; HPT to progress to Open
4		As above	No P1	12-month holding period
5		Logbook supervised 100 hours voluntary; Zero BAC	No P1	12-month holding period
6*		See footnote	N/A	N/A
7	Minimum 6-month holding period; No requirement to display L plates; No log book; Zero BAC		As per Treatment Group 1	As per Treatment Group 1
8	As above		As per Treatment Group 3	As per Treatment Group 3
9	As above		As per Treatment Group 4	As per Treatment Group 4
10*	As above		N/A	N/A

\* Had not progressed past Learner phase at time of evaluation

# Analysis Design

- Etiological: before after study with comparison group
- Comparison group: fully licensed drivers aged 25-35 years
- Before and After Time Periods
  - Before: July 2004 - June 2007
  - After:
    - **all crashes:** July 2007- December 2009
    - **hospital admission crashes:** July 2007 – December 2010
    - **fatal crashes:** July 2007 – November 2011
- Exposure correction
  - exposure measure: person months of license exposure
- Data aggregated across before and after periods
  - potential to analyse effects over time when sufficient data available



# Crash Data

- Supplied by TMR DAU
- All police reported crashes in QLD: Jan 2004 – Nov 2011
- Unit record data (crash, unit, casualty) including: crash date, severity, vehicle type
- Encoded customer reference number of vehicle controller supplied to facilitate linking with license data

# Licensing Data

- extracted from TRAILS for period Nov 1986 – Nov 2011.
- comparison group: aged 25-35 during July 2004 – November 2011 and holding an open licence
- treatment group: drivers entering the old GLS from July 2004 until June 2007; and new GLS from July 2007 until November 2011.
- data fields: birth date, de-identified (surrogate) customer reference number (used for data linking); an overseas or interstate transfer
- Data on each licensing event for each individual (a licensing event being any change in licence type or class) including:
  - start and end date;
  - licence type (e.g. L, P1, Open);
  - licence class (e.g. car, motorcycle, heavy vehicle using codes such as C, CA, RE, HR)

# Data Preparation

- Pre filtered license data to exclude :
  - Individual not holding a car licence (i.e. C or CA class)
  - Individuals with an interstate or overseas transfer indicator
- Identified the start and end data of each licensing phase (L, P etc.) for each individual and birthdate to classify data by:
  - Treatment or comparison group status
  - Treatment group membership
- Used results of previous step to calculate person license exposure months for each license class and study group for each month of study time period
- Merged processed licensing data to crash data to identify license stage and study group of crash involved drivers.
- Combined processed crash and license data to estimate crash rates per person license months of exposure by time period, license class and study group

# Analysis Matrix

Design Group	Pre New GLS			Post New GLS	
	Licence Phase	Treatment Group		Licence Phase	Treatment Group
Comparison	Open	Comparison		Open	Comparison
L	L (old)	Old GLS Group		L L L L L L	TG1 TG2 TG3 TG4 TG5 TG6
L7	L (old)	TG7		L (old)	TG7
L8	L (old)	TG8		L (old)	TG8
L9	L (old)	TG9		L (old)	TG9
L10	L (old)	TG10		L (old)	TG10
L				L (old)	Old GLS Group
P1	P First Year	Old GLS Group		P1 P1 P1 P1 P1	TG1 TG2 TG3 TG7 TG8
P1				P First Year	Old GLS Group
P2	P Second & sub years	Old GLS Group		P2 P2 P2 P2 P2 P2	TG1 TG2 TG4 TG5 TG7 TG9
P2				P Second & sub years	Old GLS Group
Open	Open	Old GLS Group		Open Open Open Open Open Open Open Open	TG1 TG2 TG3 TG4 TG5 TG7 TG8 TG9
Open				Open	Old GLS Group

# Statistical Methods

- Poisson log linear regression model applied to contingency table data
  - Incorporated offset to accommodate exposure measure
  - Model structure varied to estimate effects for
    - Program as a whole
    - By license level
    - By treatment group
- Separate analyses by crash severity
  - Fatal crashes
  - Fatal and Serious Injury crashes
  - All reported crashes

# Analysis table: all reported crashes

Design Group	Pre New GLS					Post New GLS			
	Exposure	Crashes	Crash rate	Exposure		Crashes	Crash rate		
Comparison	Open Comparison	14284774	15579	10.9060		Open Comparison	11421298	11810	10.3403
L	L (old) Old GLS Group	1394703	707	5.06918		L TG1	1405925	486	3.4568
						L TG2	11514	6	5.2110
						L TG3	8691.5	3	3.4516
						L TG4	21601	15	6.9441
						L TG5	81929.5	39	4.7602
						L TG6	561137	328	5.8453
L7	L (old) TG7	351179	141	4.0150		L (old) TG7	431417	188	4.3577
L8	L (old) TG8	32103.5	20	6.2299		L (old) TG8	22329	11	4.9263
L9	L (old) TG9	326699	203	6.2137		L (old) TG9	223114.5	121	5.4232
L10	L (old) TG10	327173.5	303	9.2611		L (old) TG10	667110	364	5.4564
L						L(old) Old GLS	7260.5	14	19.2824
P1	P First Year Old GLS Group	1217454	5050	41.4800		P1 TG1	428675	2010	46.8887
						P1 TG2	1179.5	4	33.9127
						P1 TG3	776	3	38.6598
						P1 TG7	721397.5	2652	36.7620
						P1 TG8	12710.5	38	29.8965
P1						P 1 <sup>st</sup> Yr Old GLS	351049.5	1270	36.1772
P2	P Second & sub years Old GLS Group	649248	1721	26.5076		P2 TG1	56202	134	23.8426
						P2 TG2	31	0	0.0000
						P2 TG4	1719.5	2	11.6313
						P2 TG5	23273.5	57	24.4914
						P2 TG7	309493.5	716	23.1346
						P2 TG9	107090.5	213	19.8897
P2									24.04094
						P 2+ Yr Old GLS	2079369	4999	7
Open	Open Old GLS Group	244849	426	17.3985		Open TG1	0	0	0.0000
						Open TG2	0	0	0.0000
						Open TG3	38	0	0.0000
						Open TG4	104	1	96.1538
						Open TG5	3987.5	6	15.0470
						Open TG7	12	0	0.0000
						Open TG8	4890.5	10	20.4478
						Open TG9	68765	131	19.0504
Open						Open Old GLS	1575301	2557	16.2318

# Overall Program Crash Effects

Analysis Level	Crash Severity	Licence Level or Group	% Crash Reduction*	Stat. Sig.**	95% Confidence Interval	
					Upper	Lower
<b>Overall Program Including Old GLS***</b>	Fatal	All	<b>30.67%</b>	<b>0.0253</b>	49.70%	4.44%
	Fatal + SI	All	<b>13.23%</b>	<b>0.0000</b>	18.94%	7.12%
	All Crashes	All	<b>3.74%</b>	<b>0.0397</b>	7.17%	0.18%
<b>Overall Program Only New GLS***</b>	Fatal	All	26.10%	0.0925	48.05%	-5.12%
	Fatal + SI	All	<b>9.13%</b>	<b>0.0113</b>	15.61%	2.15%
	All Crashes	All	1.27%	0.5347	5.19%	-2.80%

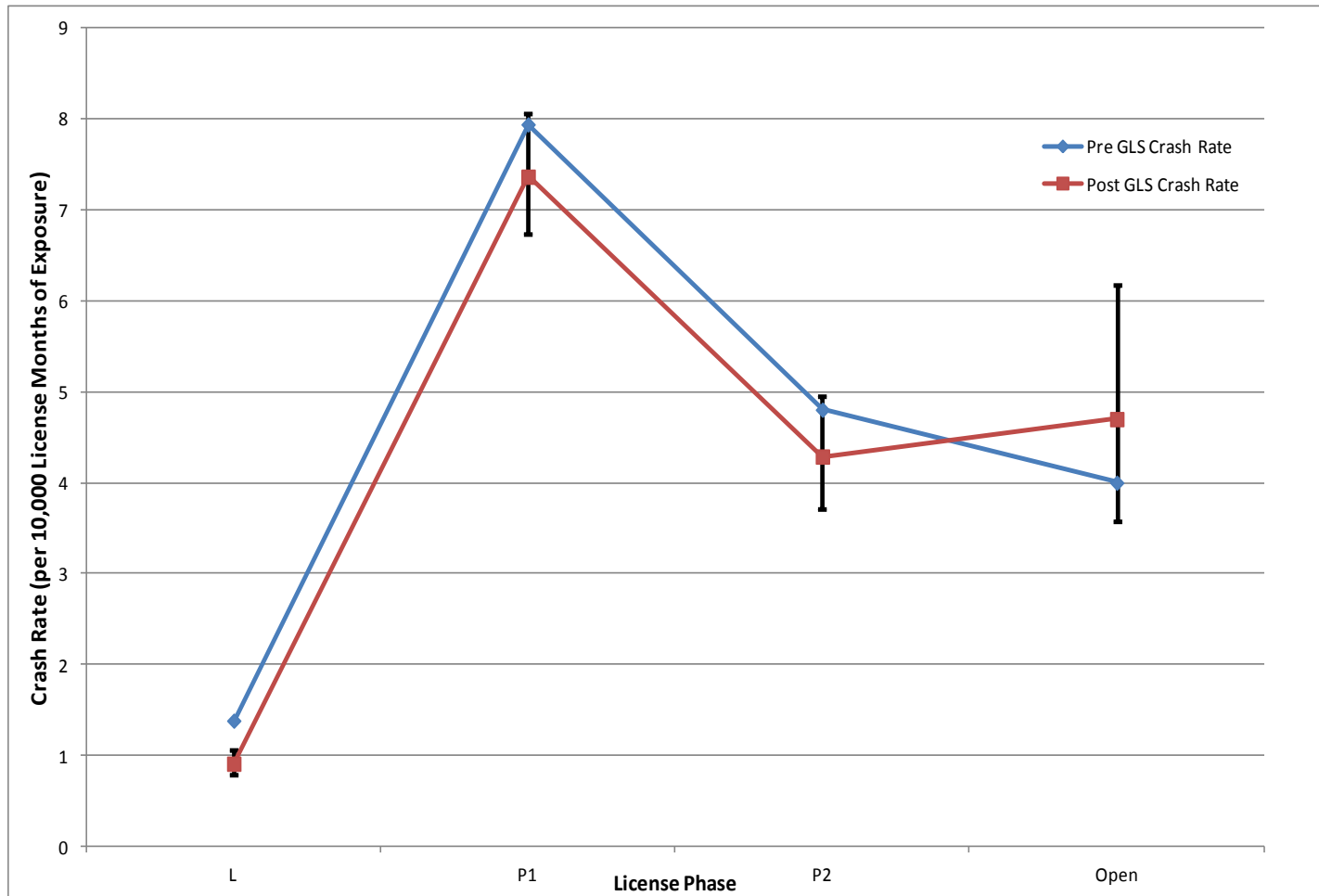
# Crash Effects by License Type

Analysis Level	Crash Severity	Licence Level or Group	% Crash Reduction	Stat. Sig.	95% Confidence Interval	
					Upper	Lower
Only New GLS by Licence Type	Fatal	Learner	-286.72%	0.1929	49.51%	2861.84%
		P1	<b>38.32%</b>	<b>0.0305</b>	60.18%	4.45%
		P2	-4.09%	0.9066	46.68%	-103.20%
		Open	59.03%	0.0787	84.85%	-10.77%
	Fatal + SI	Learner	<b>26.43%</b>	<b>0.0018</b>	39.30%	10.83%
		P1	7.24%	0.0994	15.18%	-1.43%
		P2	10.72%	0.1207	22.63%	-3.03%
		Open	-17.48%	0.2467	10.54%	-54.27%
	All Crashes	Learner	<b>12.73%</b>	<b>0.0088</b>	21.18%	3.36%
		P1	-2.76%	0.2503	1.90%	-7.63%
		P2	<b>10.32%</b>	<b>0.0068</b>	17.13%	2.96%
		Open	-15.32%	0.1383	4.49%	-39.25%





# Overall Crash Effects by License Type



# Crash Effects by Learner Conditions

Analysis Level	Crash Severity	Licence Level or Group	% Crash Reduction	Stat. Sig.	95% Confidence Interval	
					Upper	Lower
TG1-6 vs. TG7-10 (only new GLS)	Fatal	TG1-6	13.92%	0.4409	41.21%	-26.03%
		TG7-10	<b>41.48%</b>	<b>0.0165</b>	62.22%	9.33%
	Fatal + SI	TG1-6	-0.12%	0.9778	7.87%	-8.80%
		TG7-10	<b>18.78%</b>	<b>0.0000</b>	25.63%	11.30%
	All Crashes	TG1-6	<b>-9.96%</b>	<b>0.0002</b>	-4.59%	-15.61%
		TG7-10	<b>8.26%</b>	<b>0.0002</b>	12.38%	3.96%

# Crash Effects: Treatment Group1

Analysis Level	Crash Severity	Licence Level or Group	% Crash Reduction*	Stat. Sig.**	95% Confidence Interval	
					Upper	Lower
TG1 by Licence Type***	Fatal	Learner	37.42%	0.7408	96.11%	-905.71%
		P1	27.20%	0.1836	54.40%	-16.23%
		P2	-3.41%	0.9310	51.56%	-120.73%
	Fatal + SI	Learner	<b>41.00%</b>	<b>0.0000</b>	52.97%	25.99%
		P1	-4.23%	0.4133	5.62%	-15.10%
		P2	-2.11%	0.8255	15.18%	-22.93%
	All Crashes	Learner	<b>28.08%</b>	<b>0.0000</b>	36.08%	19.07%
		P1	<b>-19.22%</b>	<b>0.0000</b>	-12.62%	-26.21%
		P2	5.13%	0.5604	20.55%	-13.28%

# Discussion & Conclusions

- Complex but effective evaluation framework established
  - Estimation of overall GLS effects as well as in subgroups
  - Level of detail greater than any previous evaluation
  - Quality of data excellent
- Comparison group seems to be robust, exposure adjustment effective
- Results
  - To date new QLD GLS seems to be effective overall in reducing crashes
  - Results by license stage & treatment group less clear
    - Lack of consistency by license stage, groups & crash severity
    - Groups with old learner conditions showing greater crash reductions but have held learner licenses longer and on P2 longer (a-typical group)

# Discussion & Conclusions

- Treatment Group 1 result of primary importance – represent likely long term effectiveness of GLS
  - Learner stage crash reductions
  - Crash effects in P1, P2 phase inconclusive but maximum 15% reduction
  - Need to continue to monitor this group
- Evaluation severely hampered by limited time period of after implementation crash data
  - Need to revisit evaluation when an additional 2-3 year of crash data available (particularly fatal + SI)

# Acknowledgments



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# Questions