

The Long-Term Effects and Safety Benefit Functions for Saskatchewan's Graduated Driver Licensing Program

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Overview

- Background
- Objectives
- Study Data
- Analytical Approach
- Results
 - Overall and Relative Contributions
 - Long-Term Effects and Safety Benefit Functions
- Conclusions and Implications

Background

- Beginning drivers are an inherently risky bunch
- In Saskatchewan young driver risk twice that of older drivers
- Introduced Graduated Driver Licensing Program in 2005
- Initial effects of program
 - 18% reduction in at-fault crash risk of GDL participants
- No comprehensive long-term evaluation conducted to date
- At what point should GDL program be revamped?

Aim of Study

- Evaluate program effects long-term
 - Benefits over full program cycle
 - Relative contribution of program stages
 - Develop long-term safety benefit functions to identify points in time for revamping program

The Saskatchewan Program

- Learner Stage: 9 months
 - Supervision by qualified driver
 - Night-time restrictions
 - Passenger restrictions
- Novice 1 stage: 6 months
- Novice 2 Stage: 12 Months
- Full Cycle: 27 Months—Full Licensure
- Min Requirements
 - Minimum age 16
 - Zero tolerance for Blood Alcohol Content (BAC)

Study Data And Subjects

- SGI AutoFund database
- Traffic Accident Database
- Collisions involving two-month driver samples were tracked for 70 months (post-GDL cohort: October 2005 – August 2011; pre-GDL cohort : October 1999 – August 2005).

Profile of tracked Subjects

Age Category	Post-GDL Cohort (Starting 01 Sept '05)			Pre-GDL Cohort (Starting 01 Sept '99)		
	Female	Male	Total	Female	Male	Total
15-19	1565	1562	3127	2134	2134	4268
>19	145	90	235	174	124	298
Total	1710	1652	3362	2308	2258	4566

Analytical Procedure

- Negative Binomial Regression Technique
- Approximate collision counts with GEE accounting for correlation in longitudinal data
- Response Variable: Collision Incident Rate
- Post-GDL versus pre-GDL potential percent reduction in collision rates
- Development of Safety Benefit Functions

Modeling Results: GEE parameter estimates

Learner Stage Example

Variable		B	SE	Z-score	P	Relative Risk
Intercept		-7.8533	0.2575	-20.49	≤ 0.0001	
Period	Post-GDL	-1.1356	0.0288	1554.1	≤ .0001	0.3212
Period	*Pre-GDL	0	0	.	.	
Month		0.1979	0.0458	4.32		
*Reference level						

Percent Reduction in Collision Incidence
 $(1 - 0.3212) * 100\% = 68\%$



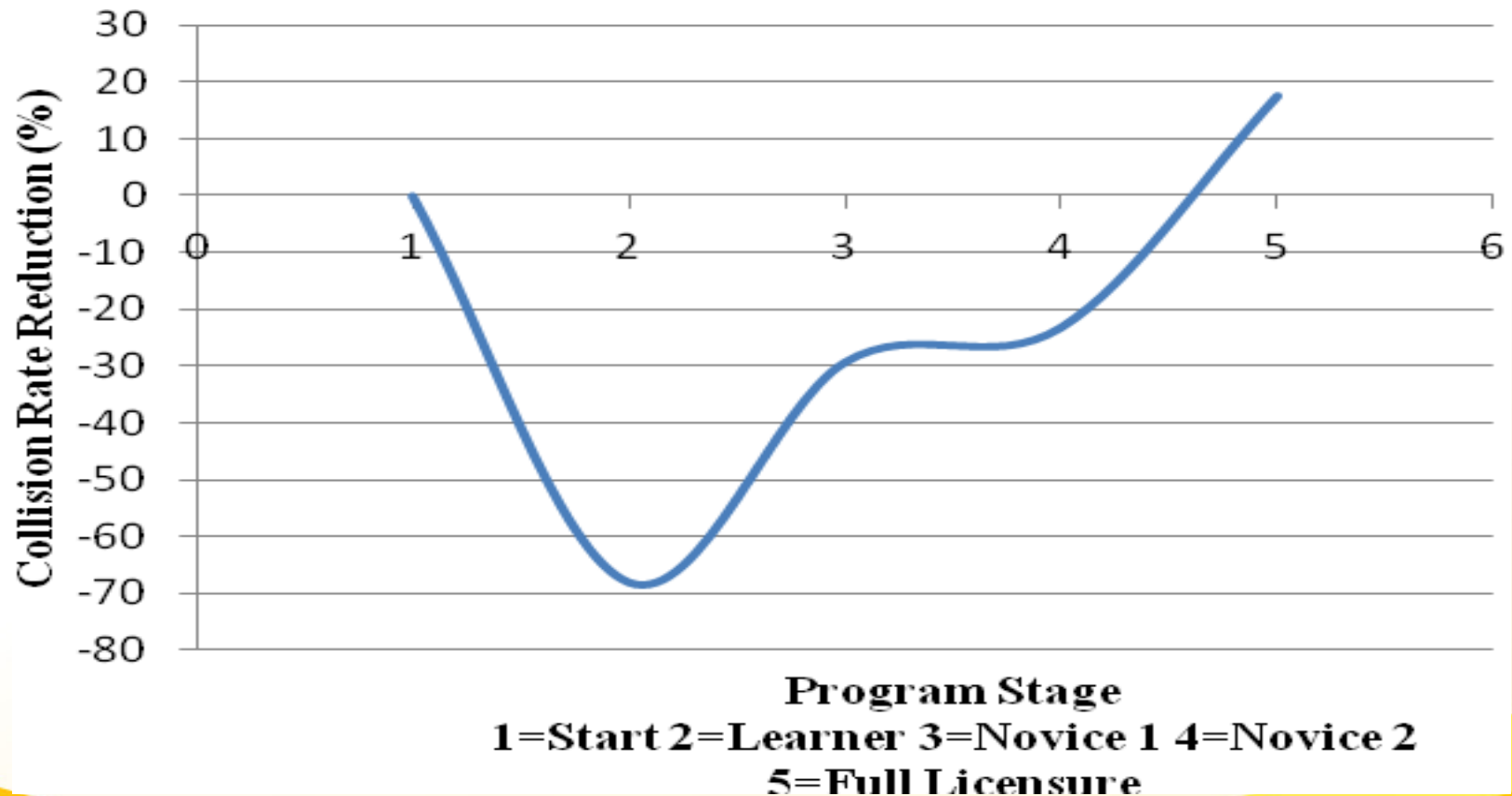
Summary of Modeling Results:

Model Categories	GDL Full Cycle 27 months	Learner Stage 9 months	Novice 1 Stage 10-15 Months	Novice 2 Stage 16-27 Months	Experienced Stage >27-70 Months
Overall	-36.7%* (-89)**	-67.9% (-26)	-29.2% (-24)	-23.1% (-20)	+17.6% (+49)
Female	-25.8% (-51)	-56.9% (-17)	-33.0% (-23)	-7.54% (-8)	+31.2% (+66)
Male	-43.3% (-126)	-78.6% (-37)	- 26.3% (-24)	-33.3% (-52)	+9.0% (+31)
15-19	-34.1% (-85)	-75.4% (-29)	-28.8% (-24)	-24.4% (-32)	+17.6% (+51)
>19	-15.4% (-23)	-14.8% (-6)	-41.9 (-16)	+7.22 (+6)	9.2% (+53)

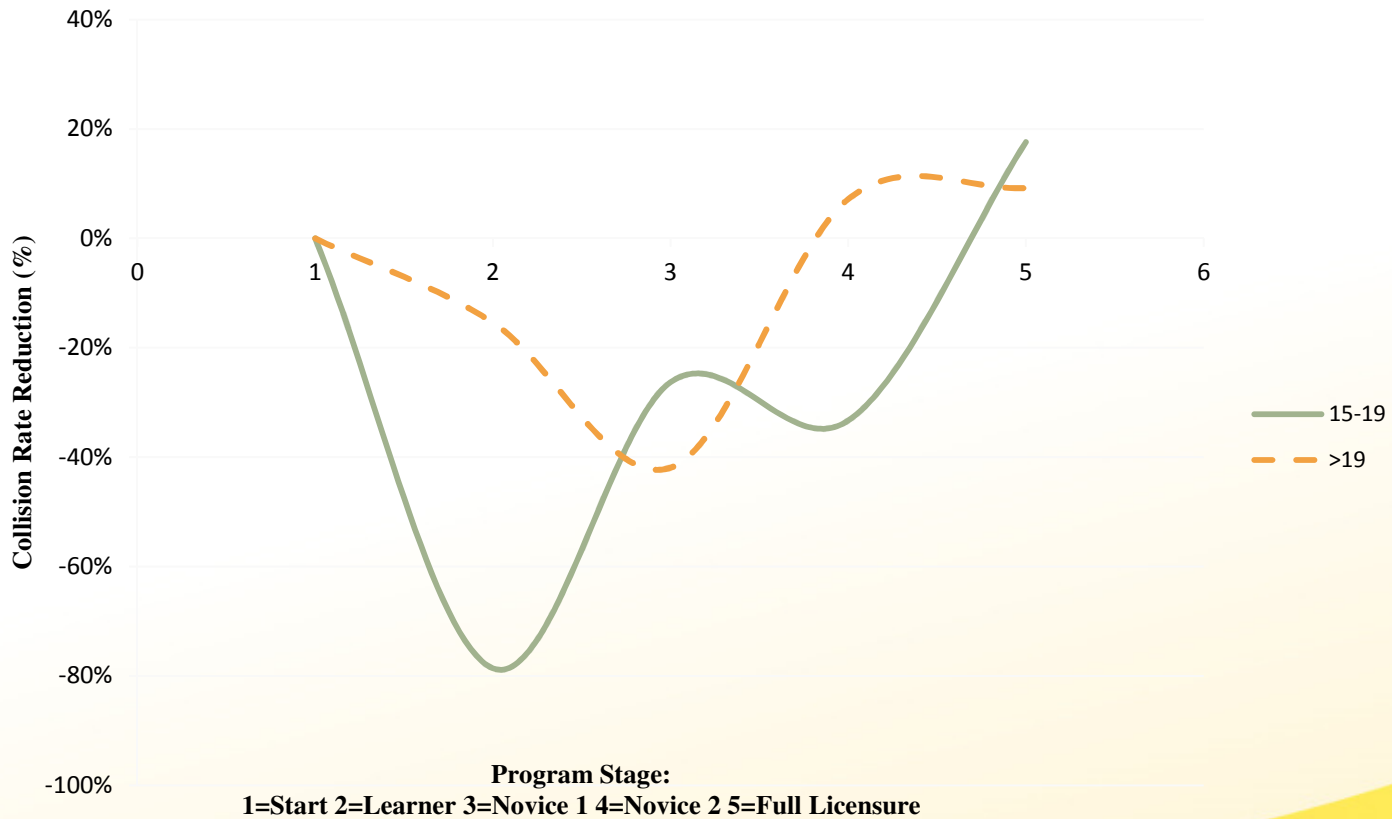
*Percent Reduction in Collision Risk

**Collisions per 1000

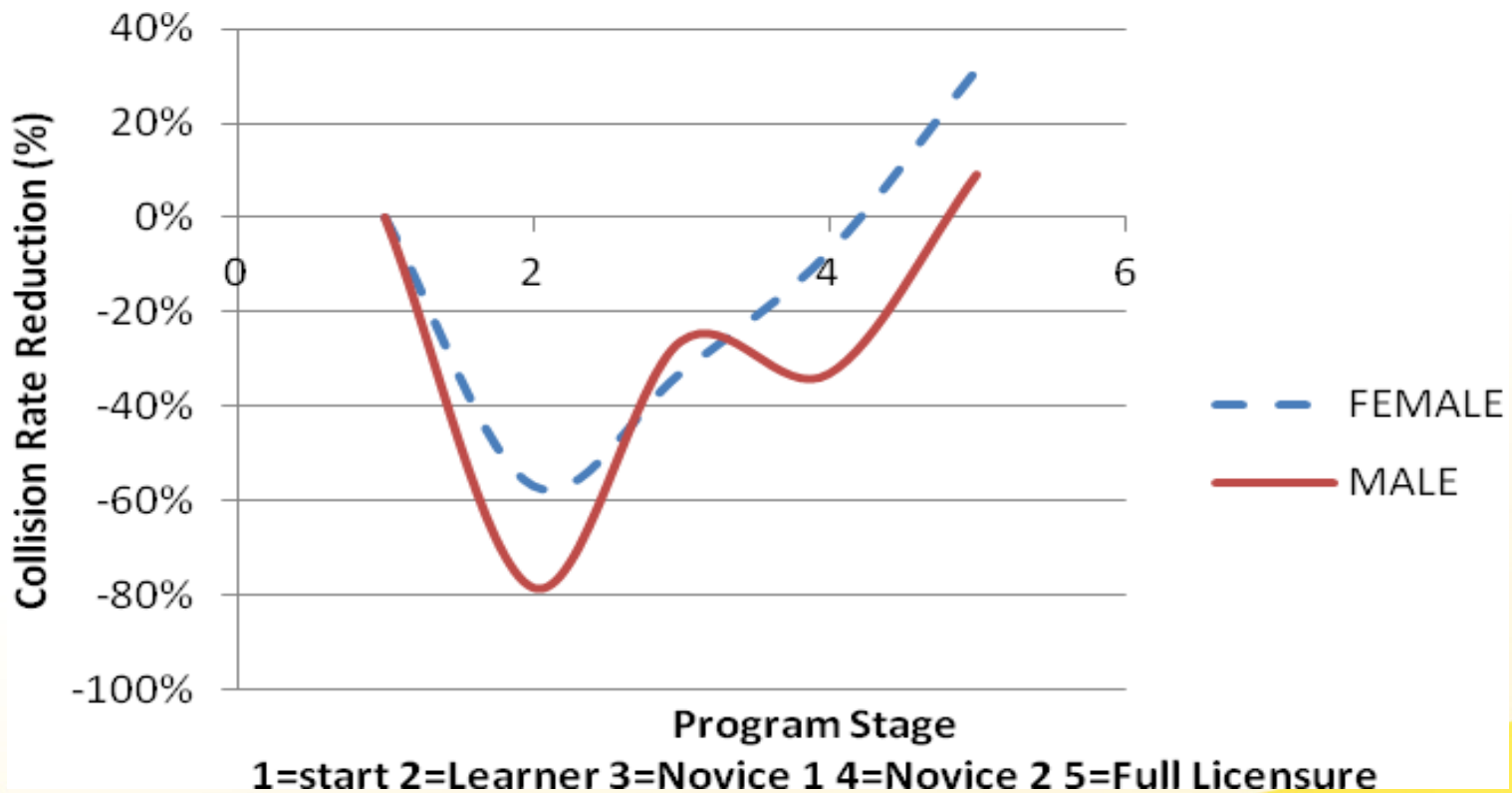
Long-Term Safety Benefit Function: Overall



Overall Long-Term Safety Benefit Function By Age



Overall Long-Term Safety Benefit Function by Gender



Conclusions

- The GDL overall safety benefits: 36%.
- The greatest impact: GDL learner stage
- Significant reduction in benefits at Novice stages
- Most reductions attributed to 15-19 year olds
- The benefits not sustainable in the longer-term
- The overall safety benefits completely dissipates ten months following full licensure.
- Point of complete dissipation of benefits varies by age and gender
- Benefits sustained longer for males and 15-19 year olds

Policy Considerations

- Generally, program reinforcement should be effected 10 months following program completion
- For targeted revamping, reinforcements directed at 15-19 year old should occur about 10 ten months following completion of the full program cycle.
- Reinforcement GDL program for older drivers should occur well before they complete the program.

Questions?