



PROGRESSION THROUGH GRADUATED DRIVER LICENSING PROGRAMS

FINAL REPORT



The knowledge source for safe driving

Progression through Graduated Driver Licensing Programs

Final Report

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The Traffic Injury Research Foundation

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EXECUTIVE SUMMARY

Introduction. Over the past few decades, all jurisdictions in the United States and Canada have implemented some version of a Graduated Driver Licensing (GDL) program to address the elevated crash risk of young and novice drivers. GDL has proven popular not only because such a licensing system makes sense but in large part because research has demonstrated its safety benefit overall, as well as in terms of the benefits of specific conditions/restrictions. Far less is known about how teens progress through GDL and trends in licensing rates. National licensing data are often inaccurate in terms of counting the numbers of licensed teen drivers overall or at different stages of GDL (learner, intermediate and full license), primarily because of the lack of licensing data counts in most states. The purposes of this study are to examine, in detail, license patterns and progression through GDL in one Canadian province (Ontario) and one U.S. state (Oregon) with different GDL programs, making it possible to examine how different features (e.g., licensing at a younger or older age, a shorter or longer minimum learner permit period) influence license rates and progression through GDL.

Methodology. Descriptive and regression analyses were used to analyze licensing data on instruction permit issue dates, intermediate license issue dates, and driver education completion dates as well as date of birth and sex for individuals entering the GDL program over several years in Ontario and Oregon. Regression (linear and logistic) models helped to determine what GDL features are associated with progression through the learner stage and the intermediate license stage.

Results. The descriptive analyses showed that although in both jurisdictions, many drivers enter in the learner period at the youngest age allowed by the GDL program, almost 57% of Ontario drivers and about 20% of Oregon drivers enter the learner stage at an older age. The analyses also showed that almost 20% of Oregon drivers and 37% of Ontario drivers were non-progressors in the learner stage (i.e., someone who has not progressed to the intermediate stage after being eligible to do so for at least one year).

The regression analyses suggested that most of all the socio-demographic characteristics examined (driver education status, sex, age at license issuance) were associated with progression through GDL. The logistic regression analyses show that drivers who have taken driver education are more likely progressors than drivers not going through driver education programs at the learner stage in both jurisdictions. In Ontario, a driver obtaining the learner license at a younger age is more likely to progress through the learner stage than an older driver. It is similar at the intermediate stage but the effect is less pronounced. In Oregon, a younger driver is more likely to non-progress than an older driver in the learner stage. Although male drivers tend to progress faster than females, the difference is very small.

Conclusion. There are safety benefits associated with new drivers remaining in the learner stage because they are driving under supervision which is a low-risk activity, assuming they are not violating this requirement. Safety benefits may also arise from the 68.3% of Ontario drivers not progressing from the intermediate stage to a full license, when they are eligible to do so,

because they are still under the restrictions/conditions of that stage. Such is not the case in Oregon where after 12 months on a provisional license, or at age 18, the restrictions are automatically lifted. The safety benefits of the provisional license could potentially be enhanced by not allowing premature graduation at age 18. Other policy options emerging from this research could include: applying GDL to inexperienced beginners regardless of age, which is the practice in Ontario; increasing the minimum mandatory learner age from 15 years to 16 years; and eliminating the time discount for driver education to ensure teen drivers remain in the protective learner stage for the full minimum mandatory 12-month period.

Further research is also needed to identify why new drivers in Ontario do, or do not, progress through the GDL licensing stages when eligible to do so, and the extent to which non-progression reduces crash risk; to determine why some Oregon teens delay licensure and how older teens who by-pass the GDL system progress through the licensing system; and, to determine why Oregon teens who take driver education progress through the learner period in fewer months and what implications this has on their crash risk.

INTRODUCTION

Over the past few decades all jurisdictions in the United States and Canada have implemented some version of a Graduated Driver Licensing (GDL) program to address the elevated crash risk of young and novice drivers. GDL involves a tiered system of licensing in which novice drivers are gradually exposed to driving situations over an extended period of time in low-risk environments. GDL has proven popular not only because such a licensing system makes sense but in large part because research has demonstrated its safety benefit overall, as well as in terms of the benefits of specific conditions/restrictions. Indeed, evaluation studies conducted in the United States and Canada have repeatedly shown that GDL reduces collisions among newly-licensed drivers and those programs that adopt stronger conditions/restrictions are the most effective (Vanlaar et al. 2009; Williams and Mayhew 2008; Williams et al. 2012; Mayhew et al. 2014).

Far less is known about how teens progress through GDL and trends in licensing rates. National licensing data are often inaccurate in terms of counting the numbers of licensed teen drivers overall or at different stages of GDL (learner, intermediate and full license), primarily because of a lack of licensing data counts in most states. For this reason, it is not well known the age at which teens obtain their learner permit, how long it is before they pass the road test and obtain an intermediate license, and the extent to which some teens wait until they are older to obtain their learner license, and possibly by-pass the GDL program. It is important that these questions are addressed because a recent study suggested that the reductions in serious crashes among 16 and 17 year old drivers may be offset by an increase in such crashes among 18 and 19 year old drivers (Masten et al. 2011). One possible reason for an increase in crashes among older teens is that some teens may wait to become fully licensed until they are 18 or older to avoid GDL restrictions or for other reasons (e.g., no need to drive, the cost of driver education or car insurance, or purchasing and maintenance costs of a vehicle). Recent research suggests that some teens are delaying licensing until they are older (Shults and Williams 2013; Tefft et al. 2012; Williams et al. 2013). This has serious implications for teen driver policies across the U.S. and internationally.

The purposes of this study are to examine, in detail, license patterns and progression through GDL in one Canadian province (Ontario) and one U.S. state (Oregon) with different GDL programs. These two jurisdictions have been selected for two primary reasons. First, the licensing authorities in these jurisdictions retain information on license issue dates on their driver record system. The second reason is that the GDL programs in these two jurisdictions provide variations on licensing requirements making it possible to examine how different features (e.g., licensing at a younger or older age, a shorter or longer minimum learner permit period) influence license rates and progression through GDL. In fact in Ontario, GDL applies to drivers of all ages not just teens, so it is possible to compare progression through GDL for learners of different ages (e.g., a 16-year old compared to a 20-year old obtaining a license for the first time).



This report is divided in five main sections that describe the study. The first section describes the GDL programs in Ontario and Oregon. The second section describes the available data for the study. The third and fourth sections present the results of the analyses. Section three contains descriptive analyses that summarize the data in terms of driver demographics such as age, sex, urban/rural residence (Oregon only) and driver education status. The numbers of licenses, monthly trends, mean numbers of months on each license stage in each jurisdiction and for the different groups of drivers are presented. Section four includes regression analysis models and describes how some GDL and driver features influence new driver progression through the program. Specifically, linear regression and logistic regression models are used in this section. Section five contains a conclusion that briefly discusses the overall results and their policy implications.

GRADUATED LICENSING PROGRAMS IN STUDY JURISDICTIONS

Both study jurisdictions have GDL programs. Ontario implemented their GDL program in 1994 and Oregon in 2000. Each of these two programs include a learner and intermediate stage but most other conditions and requirements differ including the age of licensure and the lengths of the learner and the intermediate stages. Table 1 describes the key features of the GDL program in the two study jurisdictions.

Table 1: GDL Features in Study Jurisdictions		
	Ontario	Oregon
<u>Learner license</u>		
Minimum entry age	16	15
Minimum exit age	16 and 8 months	16
Minimum duration	8 to 12 months ¹	6 months for under 18 years Unrestricted for over 18 years
Minimum supervisor driving time		50 hours (100 hours without DE)
BAC level	0	0
Night restriction	12am – 5am	
Passenger restriction	Supervisor & # of working seatbelts	
Road restriction	no 400 series and specified highways ²	
<u>Intermediate license</u>		
Minimum entry age	16 and 8 months	16
Minimum exit age	17 and 8 months	17
Minimum duration	12 months	12 months or age 18 ³
BAC level	0	0
Night restriction	See below	12am – 5am
Passenger restriction	1 st 6 months, if driver 19 or under, only 1 passenger aged 19 or under between 12am-5am; 2 nd 6 months and until intermediate stage driver earns full license or turns 20, only three passengers aged 19 or under between 12am-5am	1 st 6 months no passenger. younger than 20; 2 nd 6 months – no more than 3 passengers. younger than 20
<p>¹ Can be reduced to 8 months if an approved driver education program is successfully completed.</p> <p>²The G1 license highway restriction includes:</p> <ul style="list-style-type: none"> o 400-series highways with posted speed limits greater than 80km/h; o Queen Elizabeth Expressway, Don Valley Parkway, Gardiner Expressway, E.C. Row Expressway; o The Conestoga Parkway from its westerly limit at its intersection with the King's Highway known as Nos. 7 and 8 to its northerly limit at its intersection with the King's Highway known as No. 86. <p>This highway condition does not apply if accompanying driver is a licensed driver instructor in Ontario.</p> <p>³ In Oregon the intermediate license lasts <u>exactly</u> 12 months or until the driver becomes 18 years old, whichever comes first.</p>		

Graduated Driver Licensing in Ontario. For drivers to participate in the GDL program in Ontario, they must be at least 16 years old, pass an eye test and a written test about the rules of the road and traffic signs. Once they pass these tests, they obtain a G1 license. At this stage they are considered a beginner driver and need to practice driving and gain experience over time.

Before new drivers can obtain a full G license, they must complete two learning levels, G1 and G2, by passing two road tests. The G1 road test can be taken after 12 months with a G1 license. Once passed the driver receives a G2 license. If the driver finishes a government-approved driver education course, they can take the first road test after just eight months. The G2 road test can be taken after 12 months with a G2 license. Once passed, the driver receives a full G license (<http://www.ontario.ca/page/get-g-drivers-licence-new-drivers> 2014).

Graduated Driver Licensing in Oregon. In Oregon, new drivers under age 18 must be at least 15 years old and they can obtain a provisional instruction permit (PIP) after passing a vision screening test and the class C knowledge test about road signs, traffic laws and other information they need to know to drive in Oregon. At age 16 they could obtain a provisional driver license (PDL) provided they hold a PIP for at least six months, pass a vision screening test, a “Safe Driving Practices” knowledge test and pass the drive test or present a hard plastic Driver Education Certificate of Completion card issued by the State of Oregon, Transportation Safety Division. The time requirement does not apply if the driver submits a valid license from another region. Drivers with a PDL are effectively out of the intermediate stage after 12 months or at age 18, whichever comes first without further testing.

New drivers 18 years and over could obtain an instruction permit (IP) if they need to gain driving experience before obtaining the driver license, but it is not mandatory. To obtain the IP they need to pass a vision screening test and the class C knowledge test. At 18 years old a new driver may obtain the full driver license (DL) provided they pass a vision screening test, the class C knowledge test and the drive test (<http://www.oregon.gov/ODOT/DMV/TEEN/Pages/index.aspx> 2014).

In Oregon neither stage is mandatory. An 18 year old could obtain the DL without going through GDL. A 15-17 year old could obtain a PIP and start a learner period and at age 18 obtain the DL without going through the intermediate stage. When they turn 18, they do not even need the minimum duration of 6 months in the learner stage.

Those over 18 years old could obtain an IP and start a learner stage, but they will not obtain a PDL since they are already eligible for a DL, so there will not be an intermediate stage for them. The instruction permit is valid for twenty-four months from the date it is issued. If the instruction permit is expired or about to expire, drivers may apply for another permit. The new permit is valid for twenty-four months from the date it is issued. Therefore, the minimum duration of the learner period in Oregon is 6 months for drivers less than 18 years old and it is unrestricted for those 18 years old and older.

DATA: DEFINITION OF STUDY SAMPLES

Licensing data containing learner license issue dates, intermediate license issue dates, and driver education completion dates as well as date of birth and sex were provided for individuals entering the GDL program over several years in Ontario and Oregon. The Oregon licensing data were obtained for another TIRF investigation from the Oregon Department of Transportation who gave permission for these data to be used in this study. The Ontario driver licensing data were obtained from the Ontario Ministry of Transportation who had initially generated these data for an internal study that they were conducting a few years ago. As a consequence, sample data from Oregon and Ontario differed, for example, in terms of years in which the types of licenses were issued. The data fields available, however, for each driver in the study were similar and include:

- > Date of birth;
- > Sex;
- > Rural/Urban residence (Oregon only);
- > Driver education status;
- > Learner license issue date;
- > Intermediate license issue date; and,
- > Full license issue date.

In the Oregon data the address zip codes were used to distinguish between urban and rural locations as indicated by the Oregon Office of Rural Health according to the U.S. Census Bureau definitions. Sample data from both jurisdictions are also similar in that they include all persons issued a learner's license (instruction permit) in the two study jurisdictions within a specified time frame (i.e., an intake period). In this regard, the samples actually constitute the populations of interest over this time frame.

In each study jurisdiction, the records of the drivers in the sample were tracked from their intake date to the date the file was generated (i.e., the tracking period). Since this study is partially using licensing data generated for other projects there are different intake periods and tracking periods in each of the study jurisdictions, however these differences are not substantial. Table 2 shows the intake and tracking periods for the samples within each study jurisdiction.

Table 2: Intake and Tracking Periods in Study Jurisdictions		
	Intake Periods	Tracking Period End Date
Ontario	Jan 1, 2004–Dec 31, 2013	April 2, 2015
Oregon	Jan 1, 2005–Dec 31, 2008	Sept 17, 2009

Ontario. Ontario implemented GDL in April 1994. The Ontario Ministry of Transportation provided TIRF with licensing data on 2,207,646 drivers (teens and adults) issued their first GDL learner license from January 1st, 2004 to December 31st, 2013 (intake period) with a tracking period ending April 2nd, 2015.

From the original data some records were not used since they did not appear to be part of the regular GDL licencing process (G1 learner license, G2 intermediate license, G full license). The three main reasons for excluding records were:

1. 20,635 records had either the learner license issue date after the intermediate license issue date or the intermediate license issue date after the full license issue date.
2. 31,237 records had a learner period shorter than 12 months but the driver did not complete a certified driving course.
3. 26,251 records had less than 8 months between a G1 and G2 (146) or less than 12 months between a G2 and a G (26,105).

In the regular Ontario GDL program the learner period is mandatory with a minimum duration of 8 months with a certified driving course or 12 months without a certified driving course. The intermediate period is also mandatory with a minimum duration of 12 months. The irregularities in the data noted above were explained by MTO as cases where the driver came from another region different than Ontario or exemptions to mandatory time periods. These exemptions apply for drivers who previously held a full class driver's license that had been invalid and the driver must start over in the program but is exempted from the mandatory time periods. Note, however, that excluding those drivers with a learner period shorter than 8 months and an intermediate period shorter than 12 months, does not guarantee excluding all drivers that came from other regions or previously held an invalid full class license. Excluding all of those cases was not possible due to a lack of data to identify them but it is expected that this will not affect the results since the remaining numbers would be relatively small. Other exclusions were also made like drivers younger than 16 (451), drivers with a first license date after their learner license date (51), and drivers with a first and full license but not an intermediate license (323).

Of the remaining 2,128,698 records, the data also included drivers who had not progressed in the intermediate period because the date when their most recent license was issued was too close to the extraction date. This issue is not present for drivers with only a G1 license, since there were at least 12 months since the last G1 was issued to the date the data were extracted. However, for those with a G2 license at the extraction date, there were 162,801 drivers whose G2 was issued less than 12 months from the date the data were extracted. These drivers have not completed the minimum duration of their intermediate stage and, as such, could have biased the analyses with respect to progression on that stage. Therefore these 162,801 drivers were excluded from the analyses of the intermediate stage but included in other analyses (specifically with respect to learner licenses).

Table 3 below shows the number of drivers who followed different paths in the GDL program, according to the final data, and how the learner and intermediate period were defined for the analyses. In the table, each row describes the three different paths in the licensing data. For

example, there are 444,570 drivers with only a G1 license (first row), these drivers were in the learner period at the date the data were extracted (track_end) thus their learner period was counted from the date their G1 was issued (G1_date) until the extraction date. There is no intermediate period for these drivers. This table also shows that 481,442 drivers had a G1 license and were holding a G2 license at the extraction date (second row) but had already been for at least 12 months in the intermediate period. There were 1,039,885 drivers who went through a complete GDL program during the study period, i.e., they completed both the learner and the intermediate period.

Table 3: Paths in the GDL program, Ontario

Path	Drivers	Learner Period	Intermediate Period
G1	444,570	G1_date - track_end	
G1-G2	481,442	G1_date - G2_date	G2_date - track_end
G1-G2	162,801	G1_date - G2_date	-
G1-G2-G	1,039,885	G1_date - G2_date	G2_date - G_date
Total	2,128,698		

Oregon. Oregon implemented GDL in March 2000. Historical licensing data were available on teens obtaining an instruction permit from January 1st, 2005 to December 31st, 2008 (intake period) with the tracking period ending September 17th, 2009. For this study, only the 108,995 teens that became 15 years old during the intake period are considered, since these are the ones that could have started their participation in the GDL program during the intake period.

From the original data, 156 records were not used since they did not appear to be part of the regular GDL program. Among these records, 97 drivers received a provisional driver license before six months after receiving their provisional instruction permit and 18 drivers have information on a provisional driver license but no reference to a provisional instruction permit. These drivers may have come from a different jurisdiction than Oregon. Also, from the 156 records excluded 41 drivers obtained their driver license (DL) without going through GDL.

After the exclusions the remaining final data contains 108,839 records. Table 4 below shows the number of drivers who followed different paths in GDL, according to the final data, and how the learner and intermediate period were defined for the analyses.

Since all PIPs were issued during the intake period (2005-2008) all drivers with a PIP at the extraction date (September 2009) had been at least 6 months in the learner stage, therefore they were eligible to progress. The drivers with an IP at the extraction date are always eligible to progress since they are over 18 years of age and there is no minimum duration requirement for their IP. Only those who received a PDL had been in an intermediate stage and the time they spent there is defined automatically counting since the moment they enter, either 12 months or the time until their 18th birthday.

Table 4: Paths in the GDL program, Oregon

Path ¹	Drivers	Learner Period	Intermediate Period
IP	872	IP - track_end	-
IP-DL	1,269	IP - DL	-
PIP	19,764	PIP - track_end	-
PIP-DL	5,973	PIP - DL	-
PIP-IP	1,208	PIP - track_end	-
PIP-IP-DL	586	PIP - DL	-
PIP-PDL	74,871	PIP - PDL	12 months or age 18
PIP-PDL-DL	4,289	PIP - PDL	12 months or age 18
PIP-PDL-IP	3	PIP - PDL	12 months or age 18
PIP-PDL-IP-DL	4	PIP - PDL	12 months or age 18
Total	108,839		

¹ (P)IP: (provisional) instruction permit
(P)DL: (provisional) driver license

The Oregon data contained information for drivers born from 1990 to 1993 and they all became 15 years old in the intake period (2005-2008), but from these drivers, only those born in 1990-1992 became 16 years old in the intake period (specifically in 2006-2008, this group does not have drivers who became 16 years old in 2005). The ones born in 1989 also became 16 years old in 2005 (inside the intake period), but since there was no license information from the time they became 15 years old (2004), there was no certainty about the age they started in the GDL program. Table 5 describes the years the teens became 15-19 years old depending on the year they were born. In order to include accurate GDL data (up to age 19) about all the teens who became 15-19 years old during the intake period (2005-2008), license information was needed for the period 2001-2004. Since the available information is from January 1st, 2005 to August, 2009 it was not possible to completely follow all drivers that went through GDL during the intake period.

Table 5: Year of birth versus year teens became 15-19 years old

Year of birth	Became 15	Became 16	Became 17	Became 18	Became 19
1986	2001	2002	2003	2004	2005
1987	2002	2003	2004	2005	2006
1988	2003	2004	2005	2006	2007
1989	2004	2005	2006	2007	2008
1990	2005	2006	2007	2008	2009
1991	2006	2007	2008	2009	2010
1992	2007	2008	2009	2010	2011
1993	2008	2009	2010	2011	2012

DESCRIPTIVE RESULTS

In this section, descriptive statistics are presented to summarize the samples in each study jurisdiction and GDL licensing stage.

Demographics

Table 6 illustrates descriptive statistics in terms of driver demographics including age, sex, urban/rural residence (Oregon only) and driver education status.

Table 6: Demographic Characteristics				
	Ontario		Oregon	
	N	%	N	%
All Drivers	2,128,698		108,839	
Sex				
Female	1,086,799	51.05	53,966	49.58
Male	1,041,899	48.95	54,873	50.42
		100%		100%
Age¹				
15			79,641	73.17
16	920,780	43.26	20,252	18.61
17	218,136	10.25	6,805	6.25
18	149,412	7.02	2,141	1.97
19	101,088	4.75		
20 and over	739,282	34.73		
		100%		100%
Residence				
Urban			62,496	57.42
Rural			46,343	42.58
				100%
Driver Education				
DE	1,156,173	54.31	25,506	23.43
non-DE	972,525	45.69	83,333	76.57
		100%		100%

¹ Age at issuance of learner license (Instruction permit)

In both jurisdictions, there are small differences regarding sex. Slightly more Ontario drivers in the GDL program are female (51%) than male (49%). Conversely, slightly more Oregon drivers in the GDL program are male (50.4%) than female (49.6%). This could be related to the sex distribution in both jurisdictions (in Ontario, the male population of interest during the study period was 48.8% and in Oregon this is 51.4%). A large percent of Ontario new drivers (43.3%) enter in the learner period at the youngest age (16 in Ontario). Most drivers in Oregon (73.2%) enter in the learner period at the youngest age (15 in Oregon). The majority (57.4%) of Oregon drivers in GDL are from urban locations. With respect to driver education, there is a difference

between these jurisdictions. In Ontario, a higher percentage (54.3%) of drivers completed a driver education program than in Oregon (only 23.4%).

The primary focus of the data analysis is to examine the length of time from a learner license to an intermediate license to a full license for drivers in each of the study jurisdictions overall as well as in terms of license issue age, sex, urban/rural residence (Oregon only), and driver education status. Table 7 shows the mean length of time in a learner and intermediate stage for each group of drivers in both jurisdictions. In between parenthesis the interquartile ranges are also given.

Table 7: Mean Number of Months as Learner and Intermediate Drivers and interquartile range

	Ontario		Oregon	
	Learner	Intermediate	Learner	Intermediate
All Drivers	29.02 (25)	31.71 (23)	13.51(6)	10.92 (0)
Sex				
Female	31.7 (30)	32.37 (22)	13.62 (7)	10.94 (0)
Male	26.22 (20)	31.08 (23)	13.41 (6)	10.90 (0)
Age¹				
15			13.77 (5)	11.56 (0)
16	19.49 (11)	31.07 (23)	13.59 (9)	8.40 (6)
17	30.08 (26)	32.80 (22)	12.09 (9)	2.28 (3)
18	35.42 (36)	32.34 (23)	7.64 (11)	
19	37.38 (38)	32.03 (22)		
20 and over	38.14 (40)	32.28 (24)		
Residence				
Urban			13.66 (7)	10.87 (0)
Rural			13.31 (6)	10.97 (0)
Driver Education				
DE	18.74 (10)	31.37 (23)	13.35 (5)	11.12 (0)
non-DE	41.24 (41)	32.39 (23)	13.56 (7)	10.84 (0)

¹Age at Issuance of learner license (Instruction permit)

In Ontario, where the mandatory minimum duration of the learner period (8 months with driver education; 12 months without) is longer than in Oregon (6 months for under 18 years old), drivers stay in the learner stage for approximately 29 months, more than two times the minimum requirement of 12 months (without driver education) and more than two times the stay for a driver in Oregon. The drivers in Oregon stay in the learner stage for approximately 14 months, slightly over two times the minimum requirement of 6 months for those under the age of 18.

In Ontario, where the intermediate period is a mandatory 12-month minimum duration, on average a driver spent more time (32 months) in that stage than in Oregon (11 months) where it is not mandatory and by definition never longer than 12 months. There seems to be no large difference with respect to sex, though in general female drivers spent slightly more time in each stage in both jurisdictions and this is more pronounced in the learner stage in Ontario. Similarly,

urban or rural residence in Oregon does not seem to make a huge difference in progression through GDL.

In Ontario, GDL applies to all beginning drivers regardless of age. On average, persons issued a GDL learner license when more than 20 years old, are on the learner period for more months than is the case for a person issued a GDL learner license at a younger age. Those issued a learner license at age 16 spend the least time in this stage. There seems to be no large difference in the time spent in the intermediate stage with respect to the age the person is issued the learner license.

In the case of Oregon, license applicants aged 18 and older initially obtain an instruction permit, not a GDL provisional instruction permit, and they progress to a driver's license, not a provisional driver's license. On average, these older teens have a shorter learner period than someone younger than 18 who has been issued a GDL provisional instruction permit (18 year olds do not have a minimum holding period for the learner license).

In Oregon, driver education does not seem to make a huge difference in progression through GDL, although DE-drivers seem to have a slightly shorter learner period and a longer intermediate period. In Ontario, driver education does make a difference in progression through GDL, with Ontario DE-drivers having a shorter learner and intermediate period than non-DE drivers. This difference is especially pronounced in comparing DE and non-DE drivers in the learner stage. In the intermediate stage the difference is almost negligible (a month on average). The DE and non-DE groups differ substantially by age in Ontario, in the non-DE group about 53% of drivers obtained the learner license at age 19 and over, versus 19% of drivers with DE.

Age at Licensing

To further understand the exact age at which people obtain a learner license, the data analysis examined the number of learner licenses issued for each age category defined in terms of year and months.

Figure 1 and Figure 2 illustrate this comparison for drivers issued a learner license in Ontario. Results for drivers aged 17 are shown in both illustrations in Figure 1 because of their small number relative to 16 year olds but not to 18 year olds. The results show that most drivers obtain their learner license in the first month at each specific age, for all ages. The figures also show that many more drivers obtain a learner license when they are 16 compared to older age groups and that this number gradually decreases with older age groups, which is consistent with results in Table 7 (note the different ranges of number of licenses on the vertical axis of the different figures). A relatively large number of Ontario drivers, however, are aged 20 and over when they obtain their learner license. The pattern for females and males is very similar, although the number of male licenses is higher in most cases for drivers between 16 and 18 years old and the number of female licenses is higher for drivers 20 and older.

Figure 1: Number of learner licenses in Ontario by age and sex, Ages 16-18

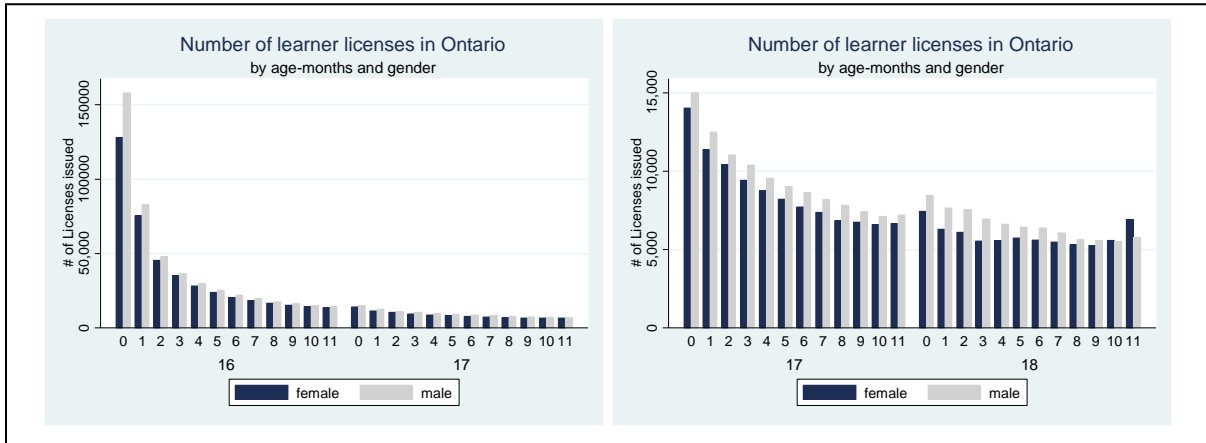
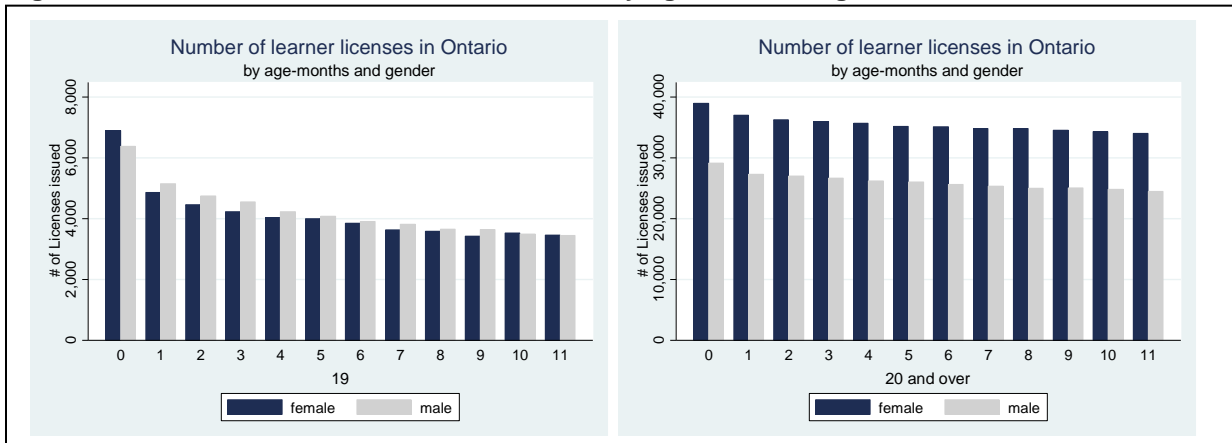


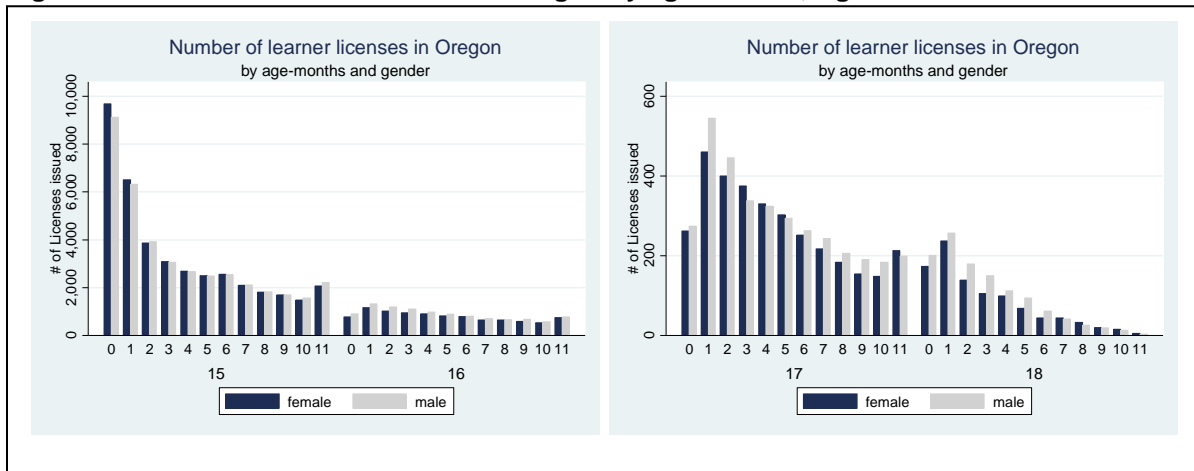
Figure 2: Number of learner licenses in Ontario by age and sex, Ages 19, 20 and over



In the case of Oregon (see Figure 3), at age 15 most drivers obtained their learner license in the first month. The pattern is a bit different for teens who obtained a learner license at ages 16, 17 and 18 where the highest frequency is in the second month rather than the first.

In both jurisdictions, the pattern for females and males is very similar, although the number of licenses is higher for male drivers in most cases. The differences seem to be more pronounced in Ontario than in Oregon.

Figure 3: Number of learner licenses in Oregon by age and sex, Ages 15-18



Monthly trends

The data analysis also examined monthly trends in licensing in each of the study jurisdictions for different driver groups (e.g., the number of learner licenses issued monthly, overall, and by sex, age at issuance, urban/rural residence (Oregon only), and driver education status). This analysis provides some indication of differences in seasonal variation in licensing for each of the study jurisdictions, and whether licensing trends have changed for different groups of interest during the study period.

Ontario. Figure 4 displays monthly numbers of learner licenses issued in Ontario from January 2004 to December 2013. Figure 5 to Figure 9 also show monthly numbers for each group defined by age, sex and driver education status. The Ontario data has a gap in 2009 around the months of September and October due to a labor disruption at the DriveTest Centres. Note the different ranges of number of licences on the vertical axis in the different figures.

According to these figures, there seems to be an increase in the number of learner licenses issued in Ontario over the years (a 32.8% increase from 77,633 licenses in 2004 to 103,074 in 2013). This trend is more pronounced for the oldest drivers (e.g., a 34.4% increase for drivers aged 20 and over versus a 7% increase for drivers 16 years old). Overall, there seems to be a seasonal pattern in the number of licenses issued in the sense that there are relevant high peaks in the months of March and July-August. Similar patterns applied to drivers in each age group although it is more pronounced for the youngest drivers; for drivers aged 20 and over the July peak is no longer present.

Figure 4: Monthly learner licenses in Ontario, Overall

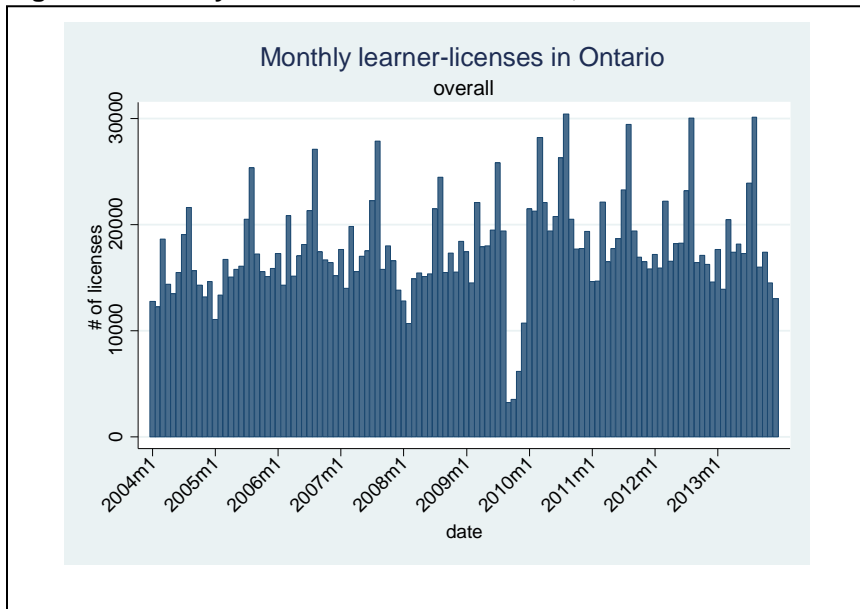


Figure 5: Monthly learner licenses in Ontario, Age 16 and 17

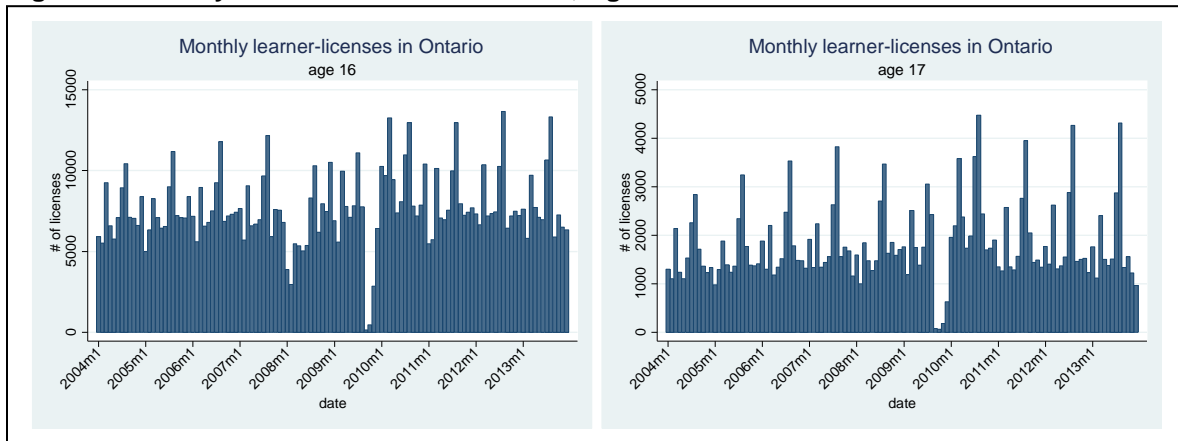


Figure 6: Monthly learner licenses in Ontario, Age 18 and 19

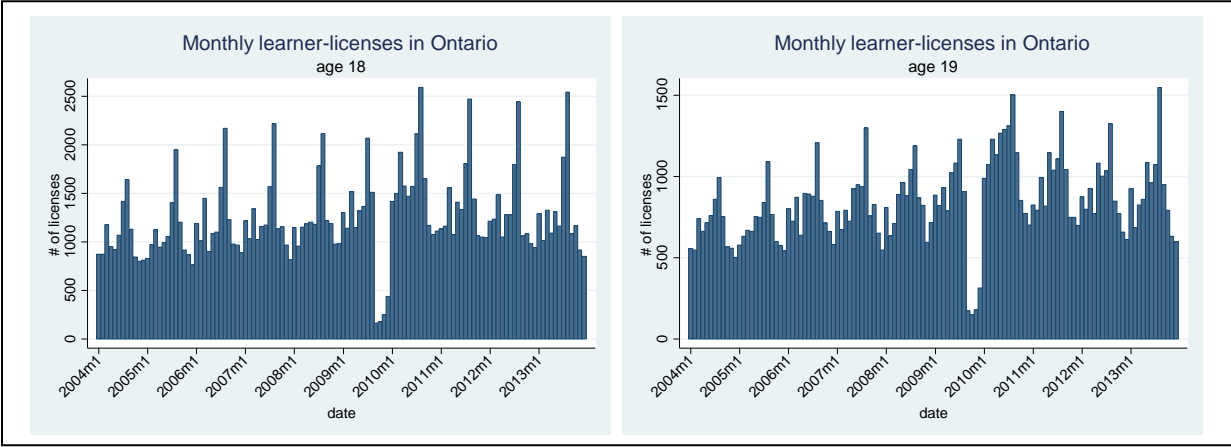
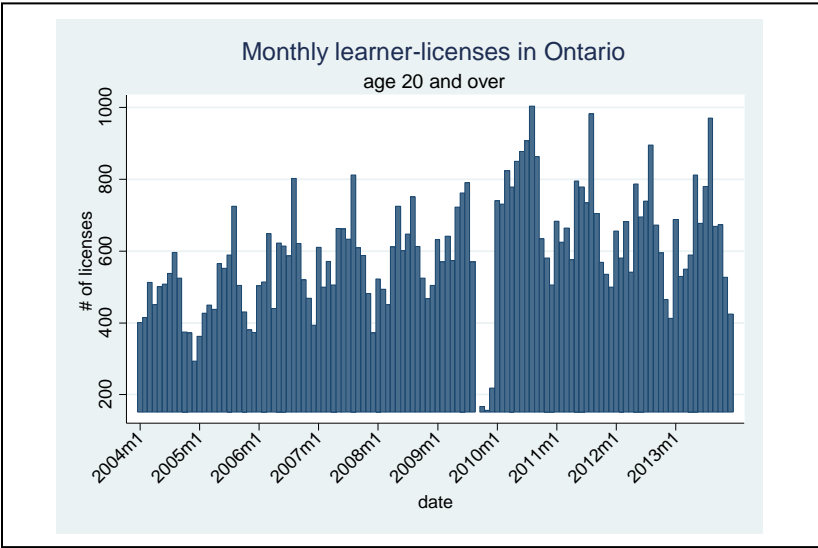


Figure 7: Monthly learner licenses in Ontario, Age 20 and over



The general pattern for the monthly trend does not seem to change much for males versus females. The numbers are greater for females but the male numbers seem to have slightly larger increases than for females (see Figure 8). The monthly number of learner licenses issued for non-DE drivers seems to have an increasing trend, unlike the trend for drivers with DE (see Figure 9).

Figure 8: Monthly learner licenses in Ontario, Male and female

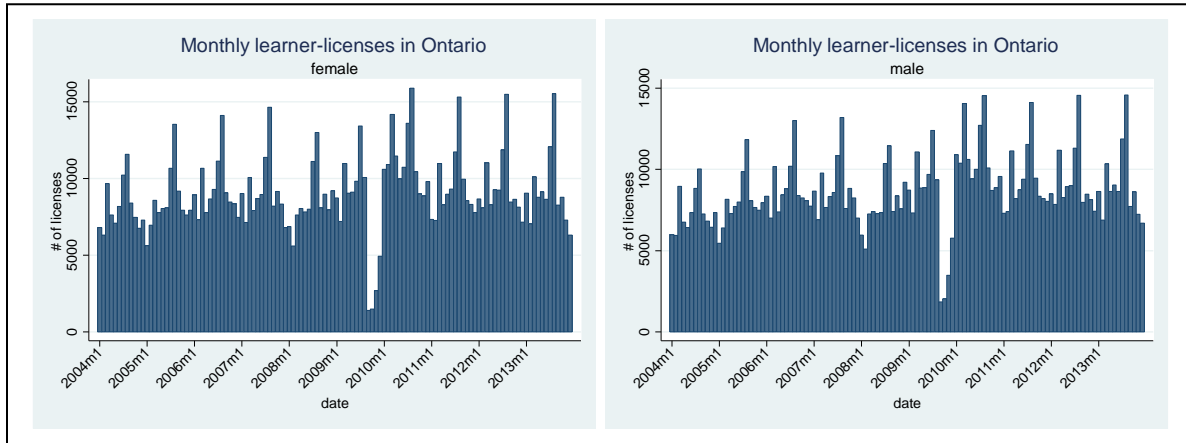
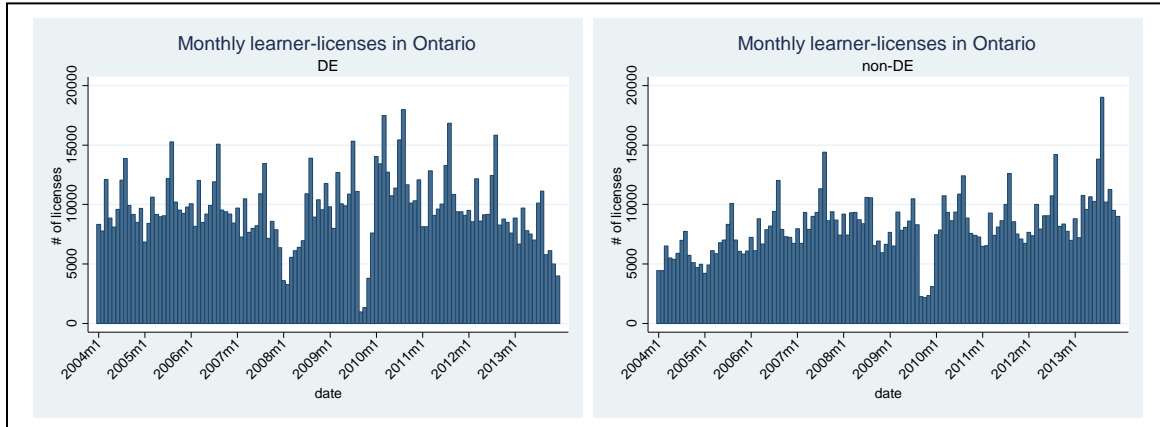


Figure 9: Monthly learner licenses in Ontario, With and without driver education



Oregon. Figure 10 displays monthly numbers of learner licenses issued in Oregon from January 2005 to December 2008.

Figure 11 to Figure 15 also show monthly licensing numbers for each group defined by age, sex, driver education status and urban/rural region. Note that since the sample only included those who became 15 years old in the tracking period, there are years in which there are no licenses issued to 16, 17, and 18 year olds over the study period. Specifically, there are no 16 year olds in 2005, 17 year olds in 2005 and 2006 and 18 year olds in 2005, 2006 and 2007. Note the different ranges of number of licences on the vertical axis in the different figures.

Overall there seems to be a seasonal pattern in the number of licenses in the sense that there are high peaks in the months of March and August, though in June and July there are also increases. Similar patterns applied to the other groups defined by differences in age, sex, driver education status and urban/rural region.

Figure 10: Monthly learner licenses in Oregon, Overall

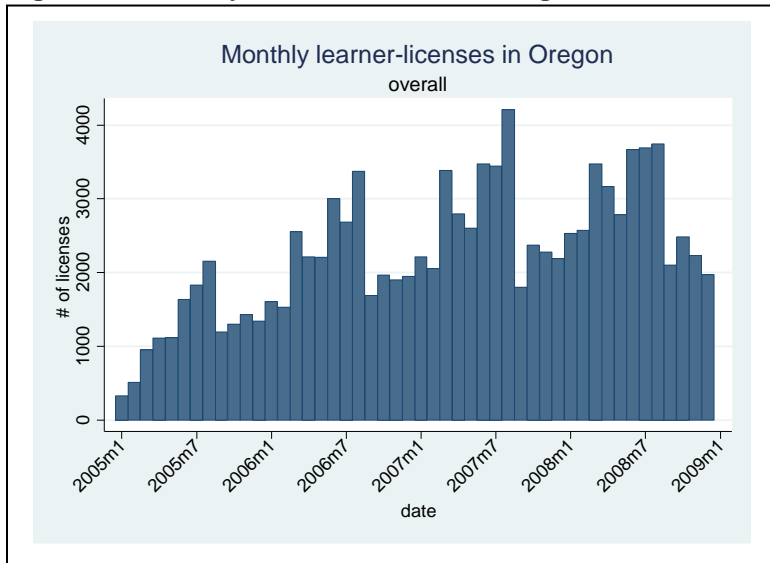


Figure 11: Monthly learner licenses in Oregon, Age 15 and 16

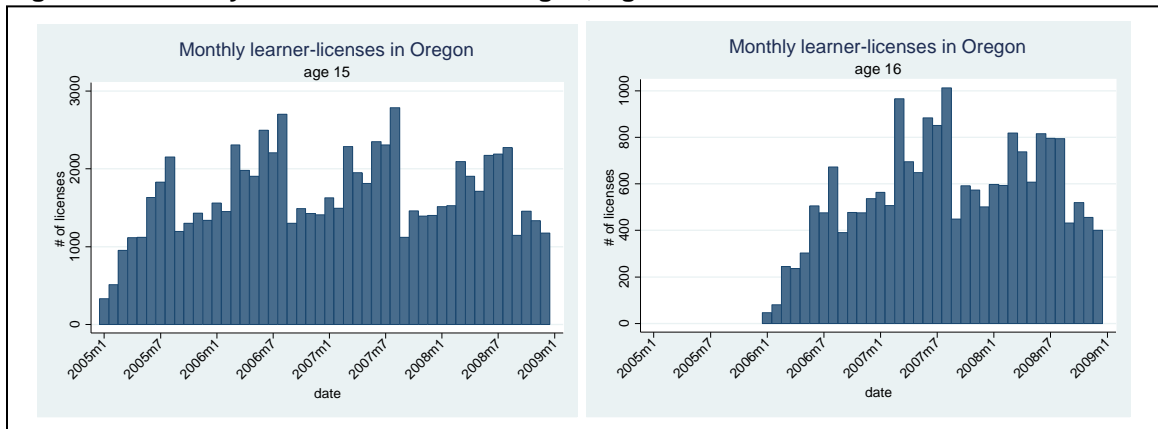


Figure 12: Monthly learner licenses in Oregon, Age 17 and 18

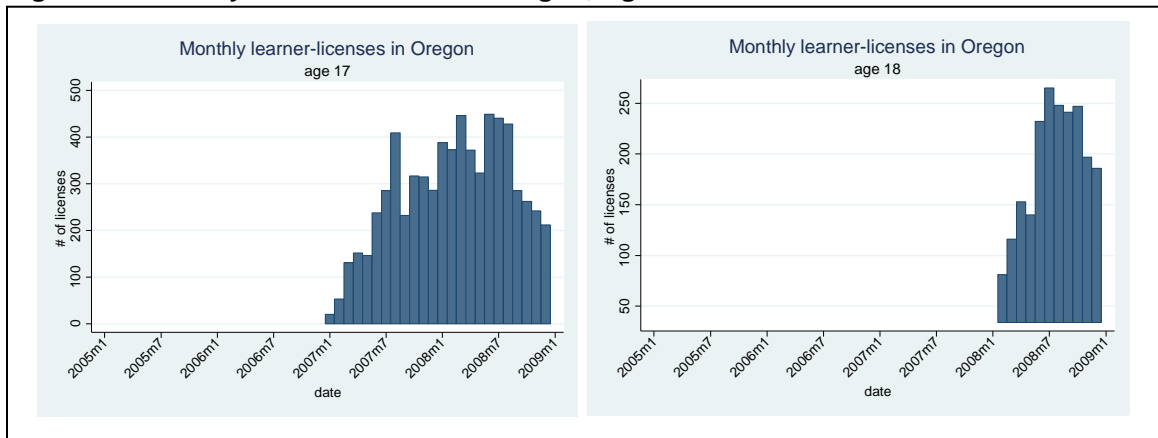


Figure 13: Monthly learner licenses in Oregon, Male and female

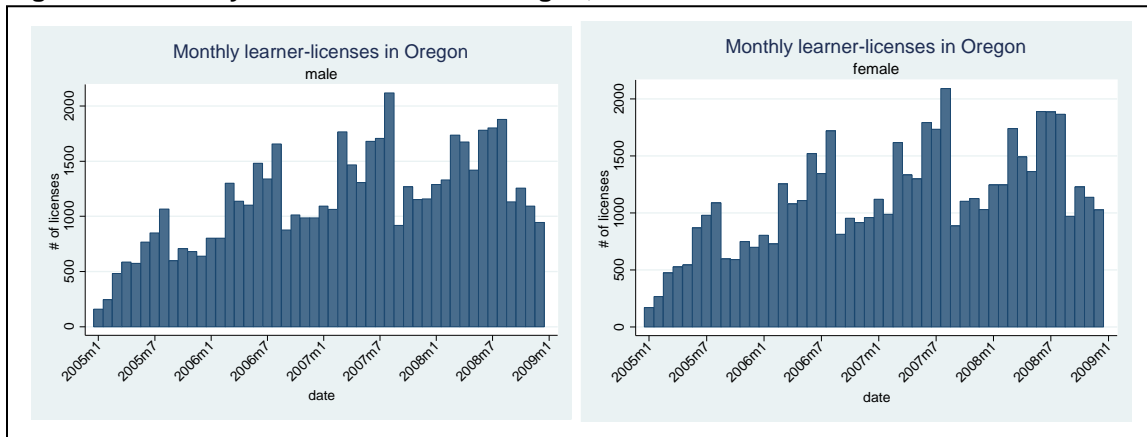


Figure 14: Monthly learner licenses in Oregon, With and without driver education

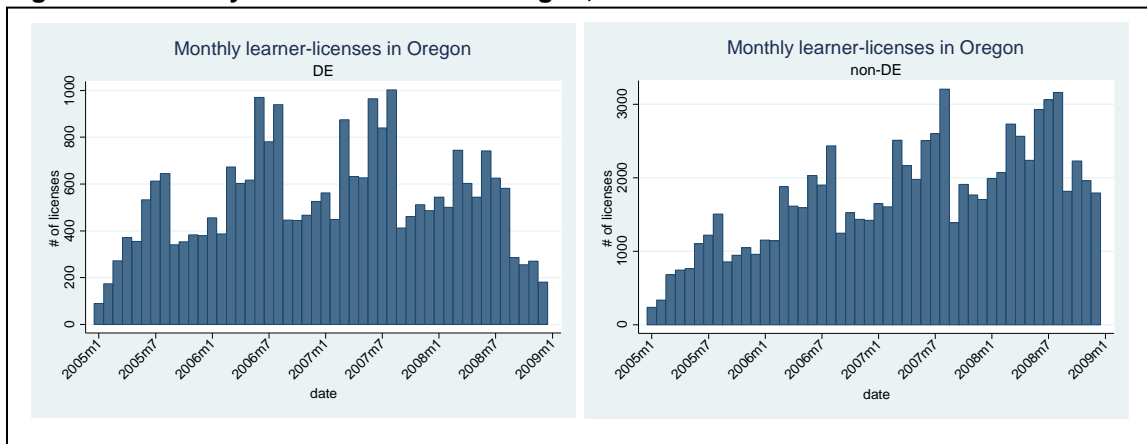
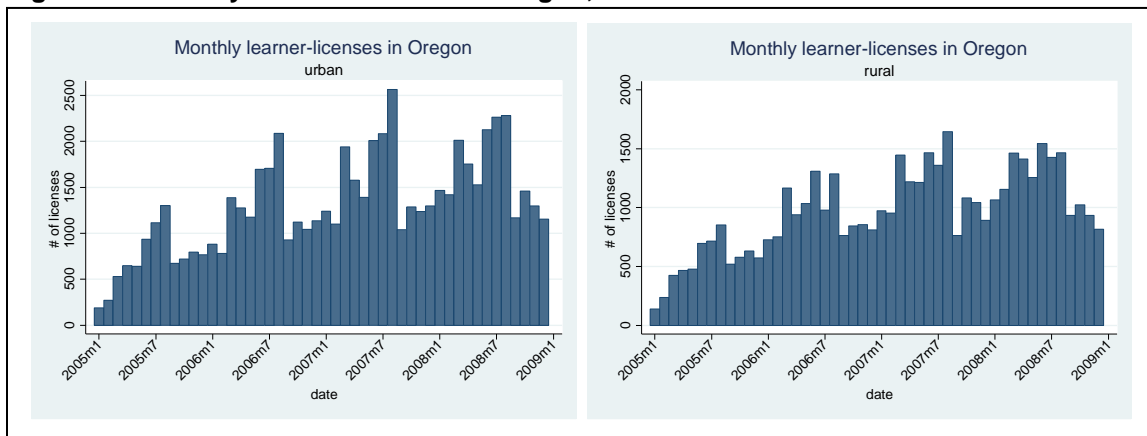


Figure 15: Monthly learner licenses in Oregon, Urban and rural



REGRESSION RESULTS

Introduction

Linear regression analysis is used with pooled data from study jurisdictions to determine what GDL or driver features are associated with number of months in the learner stage and the intermediate license stage. The focus of this analysis is to address the following types of questions:

- > Is the minimum age 15 for a learner permit in Oregon associated with slower progression through the learner stage (i.e., more months of retaining a learner license) than a minimum age of 16 in Ontario?
- > Is the age at issuance of a learner license associated with slower progression through the learner stage?
- > Is completion of a driver education course associated with slower progression through the learner stage?
- > Is sex associated with slower progression through the learner stage?

Logistic regression analyses are also used to examine the relationship between progression through GDL and demographic characteristics in each of the study jurisdictions. In the logistic regression models, the dependent variable is dichotomous with only two values: progressor or non-progressor. This approach is similar to the one adopted by researchers in New Zealand to examine why some drivers were not progressing through their GDL program (Langley et al. 2012). A progressor is defined as someone who has progressed from the learner to the intermediate license stage within one year after being eligible to do so (e.g., if the mandatory learner period is six months, they have held this license for up to an additional 12 months for a total of 1½ years maximum). A non-progressor is defined as someone who has not progressed from the learner to the intermediate stage after being eligible to do so for at least one year. A similar logistic regression analysis is performed focusing on progressing or not progressing from the intermediate license to a full license in each study jurisdiction.

The cases in which the study period ended before it could be known if the driver progressed within a year of being eligible were dropped from the corresponding analyses (logistic regression). That is the case for 77,347 drivers in Ontario whose G1 was issued less than 2 years before the data extraction date and 351,543 drivers whose G2 was issued less than 2 years before the data extraction date. In the case of Oregon, there were a total of 12,091 drivers who did not have a year between being eligible to progress and the end of the study period.

Linear regression analysis

Linear regression models are used to determine what GDL features are associated with the length of the learner stage and the intermediate license stage. In these models, the dependent

variables are months on a learner’s license (PL_months) and months on an intermediate license (PI_months). The independent variables are driver education status, sex and age at license issuance. For these models, age is treated as a categorical variable with five categories (15, 16, 17, 18, 19 and 20 and over).

Figure 16 and Figure 17 show the regression models for the length of the learner stage for each jurisdiction. In the case of Oregon, two models are presented, one without the urban variable (to be able to compare both jurisdictions) and the other with the urban variable.

Figure 16: Linear regression model for learner stage in Ontario

Ontario							
PL_months	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
DE. Y	-18.50687	.0377615	-490.10	0.000	-18.58088	-18.43286	
sex. male	-4.059277	.0341347	-118.92	0.000	-4.12618	-3.992374	
age_at_learner_lic_issue							
17	6.750494	.0595135	113.43	0.000	6.63385	6.867139	
18	9.699096	.0702644	138.04	0.000	9.56138	9.836812	
19	10.41788	.083469	124.81	0.000	10.25429	10.58148	
20 and over	9.441732	.0427837	220.69	0.000	9.357877	9.525586	
_cons	35.90952	.04283	838.42	0.000	35.82557	35.99346	

Figure 17: Linear regression model for learner stage in Oregon

Oregon							
PL_months	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
DE. Y	-.4680416	.0512407	-9.13	0.000	-.5684726	-.3676106	
sex. male	-.1888804	.0429468	-4.40	0.000	-.2730555	-.1047052	
age_at_learner_lic_issue							
16	-.2236531	.055985	-3.99	0.000	-.3333829	-.1139233	
17	-1.760801	.0898777	-19.59	0.000	-1.93696	-1.584642	
18	-6.243763	.15567	-40.11	0.000	-6.548874	-5.938652	
_cons	14.18143	.0705178	201.10	0.000	14.04321	14.31964	
PL_months	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
DE. Y	-.4982072	.0513264	-9.71	0.000	-.5988062	-.3976083	
urban	.39933	.043496	9.18	0.000	.3140783	.4845816	
sex. male	-.1828657	.0429354	-4.26	0.000	-.2670184	-.0987129	
age_at_learner_lic_issue							
16	-.2339859	.0559749	-4.18	0.000	-.3436959	-.1242759	
17	-1.77721	.0898611	-19.78	0.000	-1.953336	-1.601083	
18	-6.260345	.155621	-40.23	0.000	-6.56536	-5.955331	
_cons	13.95343	.0747376	186.70	0.000	13.80694	14.09991	

The results show that the driver features used are significant (p -values <0.001) to determine the length of the learner stage. Variables DE and sex have negative coefficients in all models which indicate that driver education and male sex are associated with shorter time in the learner stage. However, the differences in DE and sex seem to be larger in Ontario (larger absolute coefficient) than in Oregon. A difference between both jurisdictions is with respect to the age at license issue. In the model for Ontario, the variable age has a positive coefficient indicating that at older ages the length of the learner stage is longer. In the Oregon model, the same coefficient is negative indicating that at older ages the length of the learner stage is shorter. With respect to urban/rural residence in Oregon, the model shows that urban drivers are associated with a longer learner stage.

Figure 18 and Figure 19 show the regression models for the length of the intermediate stage for each jurisdiction. The results show that most of the GDL and driver features used are significant (p -values <0.001) except driver education status, sex and urban/rural region in Oregon, to determine the length of the intermediate stage. In Ontario, variables DE, sex and age 19 and over at intermediate license issue have negative coefficients which indicate that driver education, male sex and older age to obtain the intermediate license are associated with a shorter length of the intermediate stage. On the other hand, the variable age at learner license issue has positive coefficients which indicate that older age to obtain the learner license are associated with longer length of the intermediate stage. In Oregon, older ages for both learner and intermediate license are associated with a shorter intermediate stage.

Figure 18: Linear regression model for the intermediate stage in Ontario

Ontario							
PI_months	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
DE_Y	-1.121984	.0318578	-35.22	0.000	-1.184424	-1.059543	
sex_male	-1.323993	.0265202	-49.92	0.000	-1.375972	-1.272014	
age_at_learner_lic_issue_cat							
17	3.434773	.0559896	61.35	0.000	3.325035	3.544511	
18	5.427221	.0731746	74.17	0.000	5.283802	5.570641	
19	5.906941	.0882417	66.94	0.000	5.73399	6.079892	
20 and over	6.023668	.0647876	92.98	0.000	5.896687	6.15065	
age_at_interm_lic_issue_cat							
17	3.144822	.0421807	74.56	0.000	3.062149	3.227494	
18	1.070658	.059059	18.13	0.000	.9549039	1.186411	
19	-2.610907	.0742443	-35.17	0.000	-2.756423	-2.465391	
20 and over	-4.066959	.0710046	-57.28	0.000	-4.206125	-3.927792	
_cons	31.39241	.0479682	654.44	0.000	31.29839	31.48642	

Figure 19: Linear regression model for the intermediate stage in Oregon

Oregon							
PI_months	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
DE. Y	.0101031	.0115236	0.88	0.381	-.0124831	.0326894	
sex. male	.0151941	.0102844	1.48	0.140	-.0049634	.0353515	
age_at_learner_lic_issue							
16	-.5039294	.016955	-29.72	0.000	-.537161	-.4706977	
17	-5.044951	.0434892	-116.00	0.000	-5.13019	-4.959713	
age_at_interm_lic_issue							
17	-4.337052	.015418	-281.30	0.000	-4.367272	-4.306833	
18	-10.19583	.0929406	-109.70	0.000	-10.37799	-10.01367	
_cons	12.00375	.0168854	710.89	0.000	11.97065	12.03685	

PI_months	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DE. Y	.0116569	.0115596	1.01	0.313	-.0109999	.0343138
urban	-.0177084	.010407	-1.70	0.089	-.038106	.0026893
sex. male	.0149348	.0102854	1.45	0.146	-.0052246	.0350942
age_at_learner_lic_issue						
16	-.5038894	.0169548	-29.72	0.000	-.5371207	-.4706581
17	-5.045592	.0434903	-116.02	0.000	-5.130833	-4.960351
age_at_interm_lic_issue						
17	-4.336473	.0154216	-281.19	0.000	-4.366699	-4.306246
18	-10.19504	.0929407	-109.69	0.000	-10.3772	-10.01288
_cons	12.01362	.0178531	672.92	0.000	11.97862	12.04861

Logistic regression analysis

Logistic regression models are used to determine what GDL features are associated with progression through the learner stage and the intermediate license stage. In these models, the dependent variable is dichotomous with only two values: progressor or non-progressor. Note that by definition in Oregon all drivers are progressors with respect to the intermediate stage (progression is automatic) so no model for Oregon was estimated for this stage. The independent variables include license issuance age, sex, urban/rural residence (Oregon) and driver education status. Figure 20 shows the numbers and percentages of progressors and non-progressors for each jurisdiction at different stages. In both jurisdictions there is a larger percentage of progressors in the learner stage. However, the percentage of progressors is larger in Oregon than in Ontario (80.8% versus 63.3%). With respect to the intermediate stage in Ontario there is a larger percentage of non-progressors than in the learner stage (68.3% versus 37%).

Figure 20: Numbers of progressors and non-progressors at different stages for both jurisdictions

Learner Stage			
regi on	non- progre.	progressor	Total
Oregon	18, 574	78, 174	96, 748
	19. 20	80. 80	100. 00
Ontari o	758, 311	1, 293, 040	2, 051, 351
	36. 97	63. 03	100. 00
Intermedi ate Stage			
regi on	non- progre.	progressor	Total
Ontari o	910, 656	421, 929	1, 332, 585
	68. 34	31. 66	100. 00

Figure 21 shows the logistic models for the progression through the learner and intermediate stages for Ontario and Figure 22 shows the logistic models (with and without the variable urban) for the progression through the learner stage for Oregon. The results show that all of the GDL and driver features used are significant (p -values <0.05) to predict the likelihood of progression through the program. In both jurisdictions, drivers that go through the driver education program, males, and those who obtain the learner license at a younger age, are more likely to progress through the learner stage than drivers not going through driver education programs or females or those who obtain the learner license at an older age. The difference between these groups of drivers is more pronounced in Ontario where the odds for progressing in the learner stage for DE drivers are 5.6 times larger than for non-DE drivers versus 1.3 in Oregon.

In Ontario, obtaining the learner license after 16 years old decreases the odds for progressing at the learning stage. This decreasing is monotonic up to age 20 and over which has odds of progression 1.4 times (0.44/0.32) the odds for progressing at age 19 and 1.3 (0.44/0.34) times the odds of progression at 18. In Oregon obtaining the learner license at 16 or 17 decreases the odds for progressing in the learning stage compared to obtaining it at age 15. However, obtaining the learner license at age 18 increases 9.8 times the odds for progressing compared to obtaining it at age 15. In Oregon, an urban driver has 13.6% smaller odds for progressing than a rural driver ($100*(0.864-1)$).

With respect to progression in the intermediate stage in Ontario, sex and DE have similar effects, although less pronounced, as in the learner stage. Obtaining the learner license at an older age decreases the odds for progressing through the intermediate stage except at age 20 and over which has odds of progression 1.2 times (0.62/0.53) the odds for progressing at age 19. Finally, obtaining the intermediate license at ages 19 and over increases the likelihood of progressing through the intermediate stage. Drivers obtaining their intermediate license at age 17 have the smallest odds for progression through the intermediate stage (0.55 times than the odds at age 16).

Figure 21: Logistic regression models for progression in Ontario

Ontario							
Progressor_PL	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]		
DE.Y	5.604846	.0197614	488.87	0.000	5.566248	5.643712	
sex.male	1.750699	.0058573	167.38	0.000	1.739257	1.762217	
age_at_learner_lic_issue_cat							
17	.4274088	.0024178	-150.26	0.000	.4226961	.432174	
18	.3359787	.0021896	-167.36	0.000	.3317144	.3402979	
19	.3230877	.0024904	-146.57	0.000	.3182432	.3280059	
20 and over	.4368904	.0017654	-204.92	0.000	.4334439	.4403644	
_cons	.9544907	.0038025	-11.69	0.000	.9470669	.9619727	
Progressor_PI	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]		
DE.Y	1.188252	.0054874	37.35	0.000	1.177546	1.199056	
sex.male	1.49185	.0056843	104.99	0.000	1.480751	1.503033	
age_at_learner_lic_issue_cat							
17	.7170291	.0060148	-39.65	0.000	.7053367	.7289152	
18	.5348964	.0056797	-58.92	0.000	.5238794	.546145	
19	.5313742	.0067314	-49.91	0.000	.5183434	.5447326	
20 and over	.6229273	.005743	-51.34	0.000	.6117724	.6342857	
age_at_interm_lic_issue_cat							
17	.5487048	.0032303	-101.95	0.000	.5424099	.5550727	
18	.5548045	.0047844	-68.32	0.000	.5455061	.5642613	
19	1.224997	.0126641	19.63	0.000	1.200426	1.250071	
20 and over	1.421936	.0142155	35.21	0.000	1.394346	1.450073	
_cons	.4413331	.0029707	-121.52	0.000	.4355488	.4471941	

Figure 22: Logistic regression models for progression in Oregon

Oregon							
Progressor_PL	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]		
DE. Y	1.347627	.0271108	14.83	0.000	1.295524	1.401825	
sex. male	1.052053	.0172776	3.09	0.002	1.018729	1.086468	
age_at_learner_lic_issue							
16	.6737838	.013571	-19.60	0.000	.6477032	.7009145	
17	.8101757	.027901	-6.11	0.000	.7572955	.8667483	
18	9.774344	1.512212	14.74	0.000	7.217656	13.23668	
_cons	3.903914	.104791	50.74	0.000	3.703837	4.114799	
Progressor_PL	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]		
DE. Y	1.363897	.0275146	15.38	0.000	1.311022	1.418905	
sex. male	1.049918	.0172512	2.96	0.003	1.016645	1.084281	
age_at_learner_lic_issue							
16	.6759999	.0136237	-19.43	0.000	.6498183	.7032363	
17	.814531	.0280688	-5.95	0.000	.7613338	.8714452	
18	9.841962	1.522793	14.78	0.000	7.267414	13.32857	
urban	.8654175	.014487	-8.63	0.000	.8374843	.8942824	
_cons	4.242549	.1212801	50.55	0.000	4.01138	4.487039	

In conclusion, drivers who have taken driver education, or males or drivers obtaining the learner license at a younger age are more likely to be progressors in the learner stage in both jurisdictions, except for those obtaining the learner license at age 18 in Oregon who are the most likely to progress. In Ontario, a driver obtaining the learner license at a younger age or the intermediate license at an older age is more likely to progress through the intermediate stage.

CONCLUSION

This study involved a detailed examination of license patterns and progression through GDL in a Canadian province (Ontario) and one U.S. state (Oregon) with different GDL program features. Both bivariate and multivariate analyses were used on driver record data files provided by the licensing authorities in the two study jurisdictions.

The bivariate analyses showed that in both jurisdictions, many drivers entered in the learner period at the youngest age allowed by the GDL program (16 in Ontario and 15 in Oregon). Still, almost 57% of Ontario drivers and about 20% of Oregon drivers in these samples entered the learner stage at a later age, which confirms the findings from recent studies that some teens delay licensure until they are older. In the case of Oregon, the percentage of drivers who entered the learner period at an older age may be underestimated because the sample used in the analyses only included those who became age 15 in the intake period. This means that the sample excluded some teens who became age 16, 17 or 18 in the intake period and were issued an instruction permit. In Oregon, if they wait until they are age 18 or older, they by-pass GDL requirements whereas in the case of Ontario, even older learners are subject to the GDL requirements. Further research is needed to determine why some Oregon teens delay licensure and how older teens who by-pass the GDL system progress through the licensing system (e.g., length of time they hold a learner license).

Despite different mandatory minimum holding durations for the learner license in these two jurisdictions, learners aged 15 in Oregon and 16 in Ontario mostly obtained their license in their first month. This means that in Oregon even though the mandatory minimum duration of the learner period is 6-months, these 15-year olds licensed in their first month still have to wait until they are 16 to obtain a provisional license, and consequently, will have held their learner license for at least 10 or 11 months. In this regard, the mean length of time in a learner stage for 15 year olds in Oregon was 13.8 months compared to 19.5 months for 16-year olds in Ontario. As a consequence of the different licensing policies in these jurisdictions, the youngest drivers in Oregon were graduating from the learner period and driving solo at a much earlier age than is the case in Ontario. Research has shown that delayed licensure has safety benefits (McCartt et al. 2010).

There is also a seasonal pattern in the monthly numbers of learner licenses issued. For example, in Ontario, there are peaks in the months of learner license issuance in March and July-August, which may reflect months around when driver education programs are scheduled in high schools or when summer programs are offered. July and August may also be peak months for learner licenses being issued because teens are out of high school and may have more time to prepare for, and take, the knowledge test and practice driving under good weather conditions.

The regression analyses suggested that several socio-demographic characteristics examined (driver education status, sex, age at license issuance) were associated with progression through GDL (except driver education status and sex in Oregon for the learner stage). These analyses

also showed that almost 20% of Oregon drivers and 37% of Ontario drivers in the samples were non-progressors in the learner stage (i.e., someone who has not progressed to the intermediate stage after being eligible to do so for at least one year). Langley et al. (2012) similarly found that in New Zealand a substantial proportion of novice drivers eligible to do so did not progress through the learner stage (e.g., 22% of 15-year olds and 43% of 16-year olds). There are safety benefits associated with new drivers remaining in the learner stage because they are driving under supervision which is a low-risk activity, assuming they are not violating this requirement. Safety benefits may also arise from the 68.3% Ontario drivers in the sample who did not progress from the intermediate stage to a full license when they are eligible to do so, because they are still under the restrictions/conditions of that stage. Such is not the case in Oregon, where after 12 months on a provisional license, or at age 18, the restrictions are automatically lifted. Not allowing premature graduation from the provisional license stage at age 18 may have safety benefits. Further research, however, is required to identify why new drivers do, or do not, progress through the GDL licensing stages, and the extent to which non-progression reduces crash risk.

The analyses showed that older minimum age for a learner permit (age 15 in Oregon and age 16 in Ontario) was associated with a longer length of the learner stage. However, this may have also resulted from Ontario having a longer mandatory minimum learner holder period than is the case in Oregon (8 to 12 months in Ontario and only 6 months in Oregon for under age 18). Driver education was found to be associated with a shorter learner and intermediate period (in Ontario only) and the effect in the learner stage was more pronounced in Ontario (where a larger percentage of drivers participate in driver education) than in Oregon. This is likely due to the fact that some Ontario learners take driver education to reduce the length of time in the learner period from 12 months to only 8 months (i.e., a “time discount” for taking driver education). The practice of allowing a “time discount” for driver education has been shown to have detrimental effects as studies have found that new drivers who receive a time discount have higher crash rates than those not receiving a time discount (Mayhew 2007; Williams and Mayhew 2008). In Oregon, however, where there is no “time discount” for driver education, those who take driver education progress through the learner period in fewer months. Although male drivers tend to progress faster than females, the difference is very small. Further research is needed to determine why Oregon teens who take driver education progress through the learner period in fewer months and what implications this has on their crash risk.

The logistic regression analyses showed that drivers who have taken driver education are more likely progressors than drivers not going through driver education programs at the learner stage in both jurisdictions. These findings are consistent with the ones discussed above based on the linear regression analyses. In Ontario, a driver obtaining the learner license at a younger age is more likely to progress in the learner stage than an older driver. It is similar in the intermediate stage but the effect is less pronounced. In Oregon during the learner stage, the younger driver is less likely to progress than the driver obtaining the learner license at age 18. These differences in how Ontario and Oregon younger drivers progress through GDL likely result from the different GDL conditions. For example, in Oregon, the younger driver is more likely a non-progressor than the older driver because they have to wait until they turn 16 to obtain a

provisional license whereas, those who are older only have to hold the learner license for 6 months. Research has shown that a longer learner period has safety benefits (Masten et al. 2013).

In Ontario, male drivers are more likely to progress through both stages than female drivers. This may reflect that Ontario male drivers are more likely than female drivers to take driver education for the time discount and may have more interest in driving independently. This does not appear to be the case in Oregon.

Limitations of the study

Due to limitation in the Oregon data, we could not consider information for all drivers that participated in the GDL program in the study period (2005-2008). Only those who became 15 years old and had a provisional instruction permit issued in that period were considered, leaving out those who became 15 in the period 2001-2004 that could have been in the GDL program in the study period. In order to include those drivers in the study license information is needed for the period 2001-2004. For this study the Oregon information was available only for the period 2005-2009.

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