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Executive Summary

Ohio's Graduated Driver License (GDL) Law appears to be having a positive effect on young drivers. As required by the GDL Law (Amended Substitute Senate Bill Number 35), this evaluation consists of the analyses of crash, conviction and suspension data for young drivers before and after the GDL law. It should be noted that, due to time constraints and limited data, the results of this study are preliminary and additional data are required for a complete evaluation. The findings of this evaluation include:

- In examining the overall trends, young driver (ages 16 and 17) crashes have decreased in the last recent years.

- When comparing crash data of those who were licensed under GDL requirements with those who were not, overall crash rates decreased by 23% and young driver "at-fault" crashes decreased by 1%. Males saw a much larger decrease in crashes than females.

- Overall fatal crash rates of those licensed under GDL were 24% less than those licensed before GDL. Young driver "at-fault" fatal crashes decreased by 7%. This decrease translates into a savings of approximately 30 lives.

- Crashes involving young drivers and alcohol use have decreased.

- Crashes involving young drivers which occur during what is considered under the GDL as "curfew hours" have decreased.

- The overall traffic conviction rate of young drivers has decreased by 15%.

- The overall traffic suspension rate of young drivers has increased by 261%

The following report details the methodology, analysis and findings of the *Evaluation of Ohio's Graduated Driver License Law.*

The GDL Law in Ohio

On October 31, 1997, Governor George Voinovich signed the Graduated Driver License (GDL) law, designed in the hope of improving the skills of Ohio's young drivers through more training and experience. As in other states, teenagers constitute a small percentage of Ohio's drivers, but represent a disproportionately high rate of drivers involved in traffic crashes. Modeled after the standard developed by the National Highway Traffic Safety Administration, Ohio's GDL law includes the following components:

- A curfew for driver license holders under age seventeen, unless accompanied by a parent or guardian.
- A requirement to hold learner's permit for six months if under the age of eighteen.
- Driver training courses are required to provide 24 hours of classroom instruction and eight hours of behind the wheel instruction.
- A requirement of fifty hours of driving (ten at night) with a parent or guardian, in addition to driving time during a driver training. The parent or guardian must notarize this driving time.
- A reduction in the number of permitted vehicle occupants, which cannot exceed the number of installed safety belts.
- Three new suspensions: As opposed to the 12-point suspension to which adults are subject, these new suspensions allow courts to intervene with young problem-drivers early in their driving career.

Driver Training in Ohio

Both the Ohio Department of Public Safety and the Ohio Department of Education hold the responsibility of overseeing driver training and education. It is the Department of Education's responsibility to oversee driver education that is conducted through public schools, and the Department of Public Safety's responsibility to oversee driver training that is conducted through commercial, or privately-owned, schools. The two departments work together in order to maintain consistency in curriculum and other aspects of driver training.

Although this evaluation focuses primarily on quantitative analyses of crash, conviction and suspension data, it is worth mentioning that which can be considered beyond the quantitative evaluation of state of Ohio data. While there was no formal evaluation of these issues, some statements can be made about the GDL's effect on both driver training curriculum, instruction, the parent or guardian's role as driver trainer, and state-level coordination of driver training.

First, because required training time changed to 24 hours of classroom training and eight hours of behind-the-wheel training[1], instructors were required to expand their curriculum. ODPS has developed and distributed a basic curriculum. The new law provided the opportunity to incorporate additional valuable information and to offer innovative techniques for instruction to Ohio's many driver training schools. In addition, the Ohio driver training program has expanded instructor training to better accommodate other populations, such as persons with disabilities.

With improvements in curriculum came an interest in finding ways to improve actual teaching. ODPS is looking to improve driver training instruction through technology-based education. In addition, instruments have been developed to evaluate driver training instructors. Because most driver training agencies are private, this evaluation, in the past, had been done informally and sporadically. The new instrument gives Ohio a uniform tool for evaluation of instructors, incorporating observation of instructors, as well as one-on-one interviews. With this emphasis on instructors, not only is the time students spend in the classroom increased, but ODPS aims to improve the quality of instruction they receive. As mentioned earlier, the Department of Public Safety deals with all commercial driver training schools. Because the majority of young people in Ohio (approximately 85%) receive their driver training through commercial schools, the impact of improvements in teaching in commercial schools could potentially be substantial.

In addition, the GDL's requirement of time spent practicing with parents introduces a new role of parents as partners in driver training. While this was previously a role parents played informally for their children, they are now required to spend no less than 50 hours in the car assisting their child in the training process. In response to the 50-hour requirement, Ohio piloted a toolkit designed by the Network of Employers for Traffic Safety to provide parents with a curriculum of their own. While this is not a mandatory curriculum, it does provide structure to the parent-child training, and makes the time spent in the car more productive. Those parents who used the toolkit found it helpful and were more likely to cover a variety of driving experiences (weather, traffic conditions, road types, etc).[2]

[1] Before the GDL law training requirements were: 16 hours of classroom and 8 hours of behind-the-wheel training for commercial schools; and 36 hours of classroom and 6 hours of behind-the-wheel training for public schools. The GDL now has the same training time requirements for both commercial and public schools.

[2] For a summary of the findings of this pilot study, contact Elizabeth Kilgore, Office of the Governor's Highway Safety Representative (Room 426), Ohio Department of Public Safety P.O. Box 182081, Columbus, OH 43218-2081; ekilgore@dps.state.oh.us

Finally, as a direct result of the GDL law, a new position, Driver Training Coordinator, was created within the Office of the Governor's Highway Safety Representative (a division of ODPS). This individual has effectively created a community of driver training schools in Ohio and acts as a central resource for the schools. The coordinator has increased communication between the state and local schools, stressed quality of curriculum and instruction, and continues to address the needs of the profession at the state-level. In addition, a state driver training web site and a newsletter have been developed. In general, Ohio's driver training has enjoyed increased public awareness due to the GDL law.

Methodology

Amended Substitute Senate Bill Number 35 states:

"The Department of Public Safety shall maintain records and statistics indicating the driving history of persons who are issued probationary driver's licenses on and after the effective data of this act, including crash records, traffic violation convictions, and driver's license suspensions and revocations. The Department shall compile the records and statistics in an appropriate format and, not later than two years after the effective date of this section, shall submit to the presiding officers of the General Assembly a report analyzing the information and comparing the relative records of juvenile drivers before and after the effective date if this act." (Section 7)

In order to evaluate the impact of Ohio's GDL law, data from two ODPS-maintained databases were analyzed: Ohio's crash data (as reported by law enforcement on the OH-1 reporting form) and the Bureau of Motor Vehicles (BMV) driving records file. In both databases, no personal identifiers were used in any analysis.

To evaluate the immediate results of the law, a pre-GDL group and a GDL group were compared. For both groups, driving records with convictions and suspensions, as well as crash records, were analyzed. Unfortunately, we were unable to track individuals and their progress as novice drivers, but instead looked at the groups as a whole. In addition, we were able to look at these groups subset by sex.

The pre-GDL group consisted of drivers aged 16 and 17 in the years 1996 and 1997.

The GDL group consisted of drivers who were 15 ½ years old on or after July 1, 1998 (thus being eligible for a driver license on or after January 1, 1999) and who received their license under the new GDL law, being required to

complete additional coursework, the 50 hours of in-car with a parent or guardian, etc. In addition, there were individuals who were sixteen before the law went into effect, but received their license after the law went into effect, thus making them also subject to the new GDL requirements. They, too, were included in this study. Because Amended Substitute Senate Bill 35 required an evaluation report by January, 2001, this study includes only 14 months of data. In order to make the GDL group comparable with the two years of pre-GDL data, rates were weighted to reflect a two year period of the GDL group. Rates of crashes, suspensions and convictions were analyzed, and the pre- and post-groups were compared.

ODPS Crash Data

Law enforcement personnel at the scene of a crash obtain crash data. Person, Unit (vehicle) and Crash – level data are collected about each crash. The ODPS Office of Technology and Information Services maintains this database. Data were analyzed by crash severity (fatal, injury, property damage only) and by driver sex. All data analyzed reflect drivers only.

Total crashes for both the pre-GDL and GDL groups were calculated to reflect the number of crashes per 10,000 population and/or registered drivers[3]. These data were calculated for the years 1988-1999. The results are presented in Tables 2 through 9 and Charts 2 through 9.

[3] With few exceptions, all crashes were analyzed using both registered drivers and population numbers. The reason for these multiple analyses is that each group demonstrates different issues of the crash data: the registered driver rates demonstrate the effects that GDL legislation have had on those individuals who have obtained licenses under the requirements of the new legislation. In addition, rates were calculated using population numbers [as described in Feguson, et. al. (1996)] to show the decreases in crashes not only because of the guidelines of the new legislation, but because of the number of drivers who have not yet received their license because of stricter guidelines; hence, they are not yet legally driving and, hopefully, not able to cause crashes. Of the two anlyses, the registered driver numbers are the more conservative, the more accurate (because population figures are estimates) and more closely associated with specific aspects of the GDL law.

Following the methods described by Ulmer, et. al. (1999) rates for a reference group (ages 25-54) were also calculated[4]. Crash rates were then calculated for the novice driver group using the 25-54 year-old drivers' crash rate. This calculation is expressed in the following formula:

$$r_I = p_{I1} / p_{I2}$$

where p_{I1} represents the annual crash rate of novice drivers per 10,000 population / registered drivers and p_{I2} represents the crash rate of the reference group for the same year. Crash ratios for the pre-GDL group and the GDL group were then compared. This reference group not only puts the novice driver numbers in relation to a more stable population, but indicates significant changes in rates among the GDL group.

BMV Conviction and Suspension Data

Conviction and suspension data are collected by the BMV and maintained by the Office of Technology and Information Services of the Ohio Department of Public Safety. This database contains all information about drivers' histories, and is the official "driving record" of individuals in Ohio. This database is dynamic, so that convictions accumulate and eventually drop off of the record. For example, many convictions that are stored in an individual's driving record drop off after a period of three years. This was not an issue for the GDL evaluation because at the time of retrieving the data for each group, all-inclusive years and their corresponding records were still available in the database.

In analyzing conviction and suspension data, the number of convictions / suspensions were calculated per 10,000 registered drivers. The pre-GDL and GDL data were then compared. Because there are several convictions and suspensions that only apply to young drivers, the reference group of 25-54 year-olds was not used in calculations.

It should be noted that, due to time constraints and limited data, the results of this study are preliminary and additional data is required for a complete evaluation.

[4] "Strictly, the crash rates are random variables so the mean and variance of the crash rate ratio will depend on the means and variances of these random variables. However, because the reference group has many times more individuals than the target group, the variance of p_{I2} is very small, making it reasonable to consider it a constant." (Ulmer, et. al., 1999).

Results

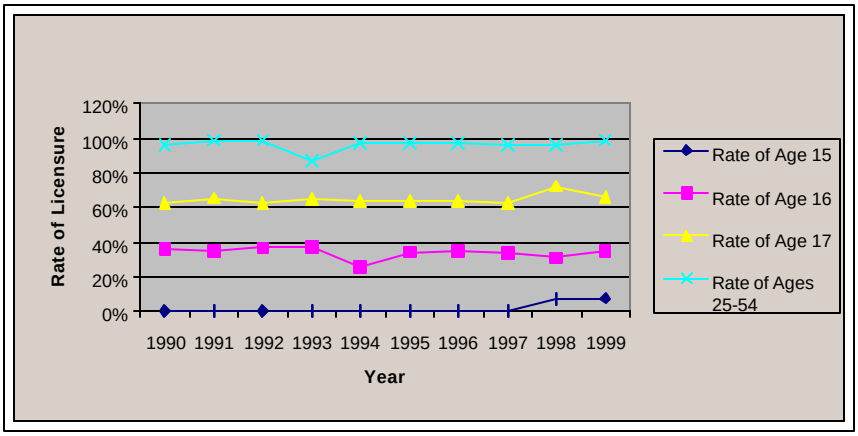
Rates of Licensure

As a preliminary analysis, rates of licensure (the number of registered drivers by population estimate) by age group were compared. Table 1 and Chart 1 indicate that no significant changes in licensure rates occurred for the reference group of 25-54 year-olds during the study period. However, rates of licensure increased slightly for 17-year-olds and decreased slightly for 16-year-olds in 1998, the GDL transition year. It is likely that these changes are, at least in part, due to GDL legislation. During the transition year of 1998, 17-year-olds may have been more likely to be licensed before the GDL law went into effect, so that they would not be subject to its new requirements. Likewise, many 16-year-olds fell under the GDL requirements, and were required to wait a minimum of six months before being eligible for license, under the new requirements of the GDL law.

Table 1: Rates of Licensure by Age Group and Year

Year	Rate of Licensure Age 15	Rate of Licensure Age 16	Rate of Licensure Age 17	Rate of Licensure Ages 25-54
1990	0%	36%	63%	96%
1991	0%	35%	66%	99%
1992	0%	37%	63%	99%
1993	0%	37%	65%	87%
1994	0%	26%	64%	98%
1995	0%	34%	64%	97%
1996	0%	35%	64%	97%
1997	0%	34%	62%	96%
1998	7%	31%	72%	96%
1999	8%	35%	66%	99%

Chart 1: Rate of Licensure by Year in Ohio



Crash Trends

Before comparing crash rates of the pre-GDL and GDL groups, historical crashes per 10,000 registered drivers and per 10,000 population were analyzed in order to demonstrate overall crash trends in Ohio.[5] Tables 2 through 5 and Charts 2 through 5 display crashes per 10,000 registered drivers for the years 1988-1999. Tables 6 through 9 and Charts 6 through 9 display crashes per 10,000 population for the years 1990-1999.[6]

[5] Because the GDL group spans multiple ages and does not consist of complete calendar years, this analysis does not accurately reflect pre-GDL and GDL crashes, but illustrates overall changes in Ohio.

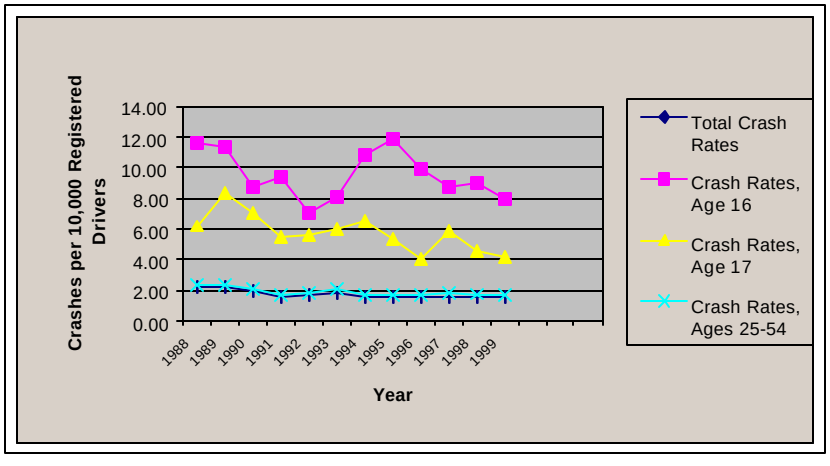
[6] Population data 1990-1999 only was used because 1988 and 1989 population figures adequately subset by age were unavailable at the time of the analysis.

Table 2 and Chart 2 display fatal crashes per 10,000 registered drivers. While fatal crash rates for all ages and for the 25-54 year-olds reference group are relatively stable, the fatal crash rates of drivers aged 16 and 17 have fluctuated, but appear to be steadily decreasing in the last three to five years.

Table 2: Fatal Crash Rates (Per 10,000 Registered Drivers) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	Fatal Crashes	Crash Rate	Fatal Crashes	Crash Rate	Fatal Crashes	Crash Rate	Fatal Crashes	Crash Rate
1988	64	11.65	70	6.18	996	2.33	1586	2.15
1989	59	11.35	84	8.29	980	2.35	1574	2.18
1990	46	8.70	68	7.00	938	2.15	1479	1.98
1991	49	9.39	55	5.53	906	1.73	1452	1.59
1992	38	7.02	55	5.64	814	1.80	1303	1.71
1993	46	8.11	59	5.96	833	2.04	1327	1.86
1994	43	10.83	66	6.54	785	1.69	1210	1.57
1995	65	11.82	54	5.32	775	1.66	1216	1.56
1996	57	9.84	42	3.99	807	1.72	1248	1.59
1997	49	8.74	63	5.90	841	1.80	1268	1.61
1998	47	8.96	55	4.52	824	1.76	1290	1.57
1999	47	7.97	47	4.19	829	1.70	1284	1.53

Chart 2: Fatal Crash Rates (Per 10,000 Registered Drivers) by Year

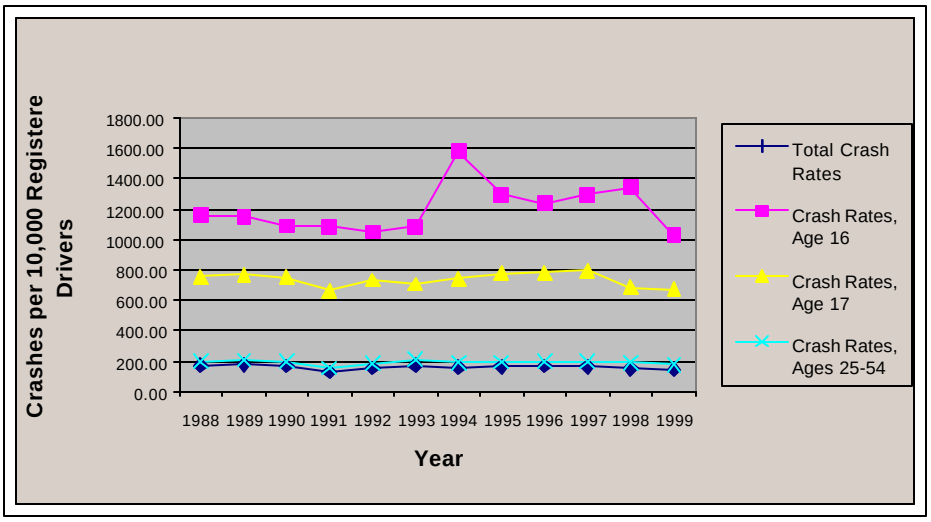


Tables 3 and 4, and Charts 3 and 4, display injury and property damage only crashes. Crash rates of 17-year-olds, 25-54 year-olds, and all drivers show little change. However, there is considerable fluctuation in crash rates of 16-year-olds. Of particular note is the decrease in injury crashes among 16-year-olds from 1998-1999, the period in which the GDL law went into effect.

Table 3: Injury Crash Rates (Per 10,000 Registered Drivers) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	Injury Crashes	Crash Rate	Injury Crashes	Crash Rate	Injury Crashes	Crash Rate	Injury Crashes	Crash Rate
1988	6374	1159.79	8558	755.96	84692	198.15	126448	171.58
1989	5992	1153.02	7794	769.15	86864	208.07	127434	176.59
1990	5755	1088.79	7296	751.37	87236	199.58	125819	168.42
1991	5651	1083.27	6603	663.66	81044	154.81	116652	127.37
1992	5684	1049.44	7183	736.11	83930	185.13	119692	156.77
1993	6144	1082.62	7020	708.85	85754	210.03	121584	170.23
1994	6284	1582.75	7507	743.69	87026	187.87	123102	159.36
1995	7134	1296.76	7914	780.03	90713	194.65	127961	164.63
1996	7169	1238.11	8262	784.51	93614	198.99	130793	166.56
1997	7267	1295.83	8507	796.44	91508	195.60	128296	163.09
1998	7047	1343.62	8370	687.58	87317	186.71	123785	150.66
1999	6061	1027.72	7540	672.16	85498	175.76	121078	144.09

Chart 3: Injury Crash Rates (Per 10,000 Registered Drivers) by Year



As is the case for injury crashes, property damage only crashes among 16-year-olds decreased during the 1998-1999 time period.

Table 4: Property Damage Only (PDO) Crash Rates (Per 10,000 Registered Drivers) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	PDO Crashes	Crash Rate	PDO Crashes	Crash Rate	PDO Crashes	Crash Rate	PDO Crashes	Crash Rate
1988	11185	2035.19	15380	1358.57	168388	393.98	257250	349.06
1989	10692	2057.42	14313	1412.47	171281	410.27	259209	359.20
1990	9739	1842.52	12339	1270.73	164481	376.31	246225	329.60
1991	9503	1821.68	11350	1140.77	155217	296.50	232173	253.50
1992	9506	1755.11	12009	1230.68	158997	350.71	235463	308.41
1993	10336	1821.29	11958	1207.46	162385	397.72	239152	334.84
1994	10698	2694.51	12721	1260.23	167979	362.63	246061	318.54
1995	11922	2167.08	13943	1374.26	172893	370.98	254206	327.05
1996	12165	2100.93	14444	1371.52	172893	367.51	263072	335.01
1997	12435	2217.37	15193	1422.39	175512	375.15	257288	327.07
1998	12101	2307.24	14939	1227.21	171168	366.02	252845	307.75
1999	11155	1891.48	14150	1261.42	177990	365.90	263342	313.38

Chart 4: Property Damage Only Crash Rates (Per 10,000 Registered Drivers) by Year

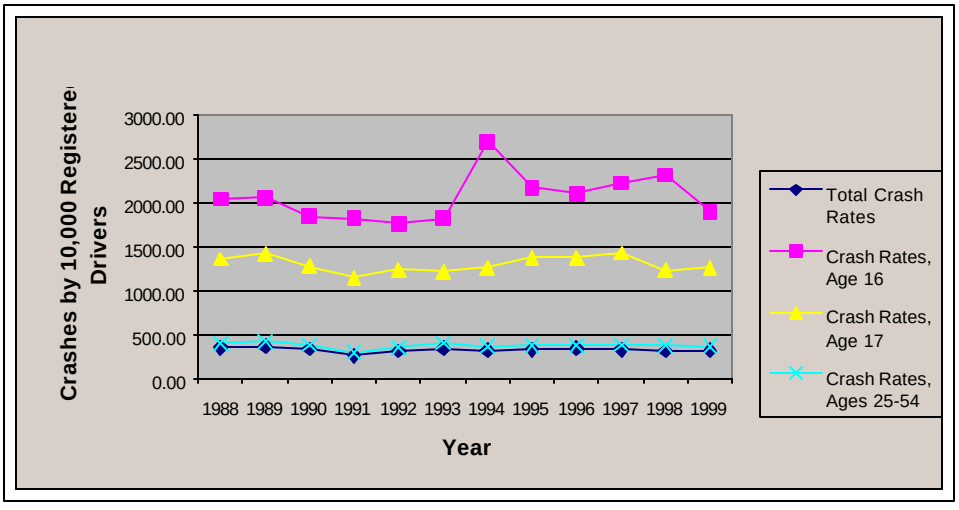
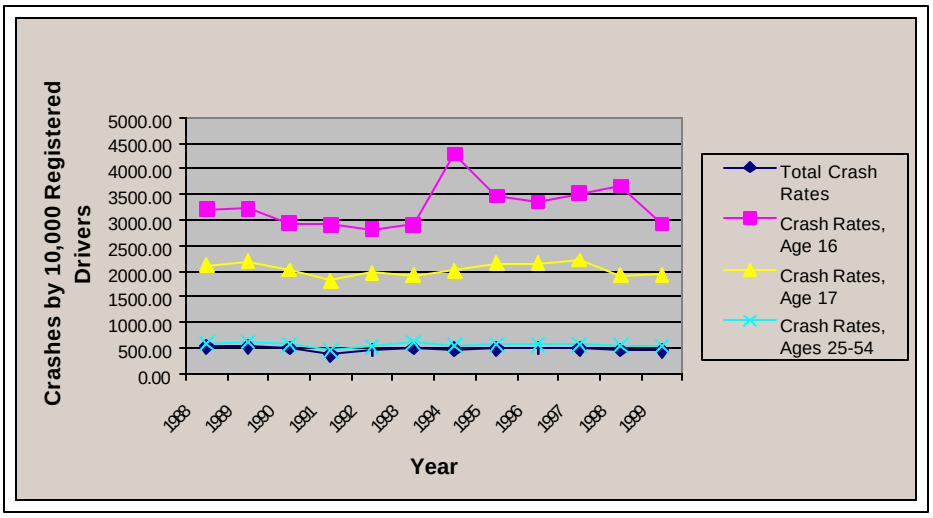


Table 5 and Chart 5 display the total crash rates (fatal, injury and property damage only crashes) for each age group. As seen in injury and property damage only crashes, 17-year-old and 25-54 year-old crash rates show very little change. Again, there is much fluctuation in the rates of 16-year-olds and a noticeable decrease in total crashes in the 1998-1999 period.

Table 5: Total Crash Rates (Per 10,000 Registered Drivers) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	Total Crashes	Crash Rate	Total Crashes	Crash Rate	Total Crashes	Crash Rate	Total Crashes	Crash Rate
1988	17623	3206.63	24008	2120.72	254076	594.46	385284	522.79
1989	16743	3221.79	22191	2189.91	259125	620.68	388217	537.97
1990	15540	2940.01	19703	2029.10	252655	578.03	373523	500.01
1991	15203	2914.35	18008	1809.96	237167	453.04	350277	382.45
1992	15228	2811.57	19247	1972.43	243741	537.64	356458	466.89
1993	16526	2912.02	19037	1922.27	248972	609.79	362063	506.94
1994	17025	4288.09	20294	2010.46	255790	552.20	370373	479.47
1995	19121	3475.66	21911	2159.61	264381	567.29	383383	493.24
1996	19391	3348.88	22748	2160.02	267314	568.22	395113	503.17
1997	19751	3521.93	23763	2224.73	267861	572.54	386852	491.78
1998	19195	3659.82	23364	1919.31	259309	554.50	377920	459.98
1999	17263	2927.17	21737	1937.78	264317	543.36	385704	459.00

Chart 5: Total Crash Rates (Per 10,000 Registered Drivers) by Year

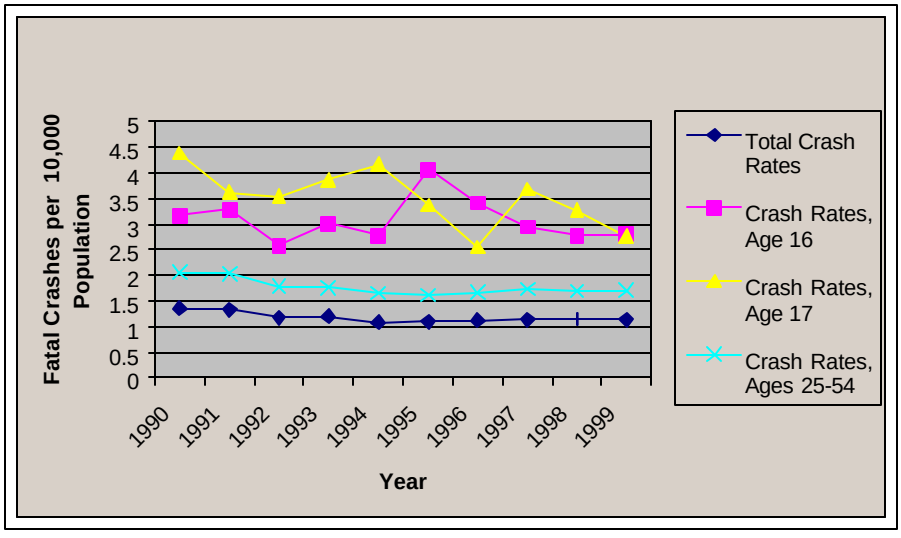


As in fatal crashes per 10,000 registered drivers, when analyzed per 10,000 population (see Table 6 and Chart 6), ages 25-54 and total fatal crash rates for all ages change very little, while rates of drivers ages 16 and 17 fluctuate considerably.

Table 6: Fatal Crash Rates (Per 10,000 Population) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	Fatal Crashes	Crash Rate	Fatal Crashes	Crash Rate	Fatal Crashes	Crash Rate	Fatal Crashes	Crash Rate
1990	46	3.16	68	4.39	938	2.06	1479	1.36
1991	49	3.28	55	3.63	906	2.04	1452	1.33
1992	38	2.58	55	3.55	814	1.79	1303	1.18
1993	46	3.01	59	3.87	833	1.77	1327	1.20
1994	43	2.78	66	4.17	785	1.65	1210	1.09
1995	65	4.07	54	3.38	775	1.62	1216	1.09
1996	57	3.41	42	2.55	807	1.67	1248	1.12
1997	49	2.95	63	3.68	841	1.73	1268	1.13
1998	47	2.78	55	3.29	824	1.70	1290	1.15
1999	47	2.81	47	2.77	829	1.71	1284	1.14

Chart 6: Fatal Crash Rates (Per 10,000 Population) by Year

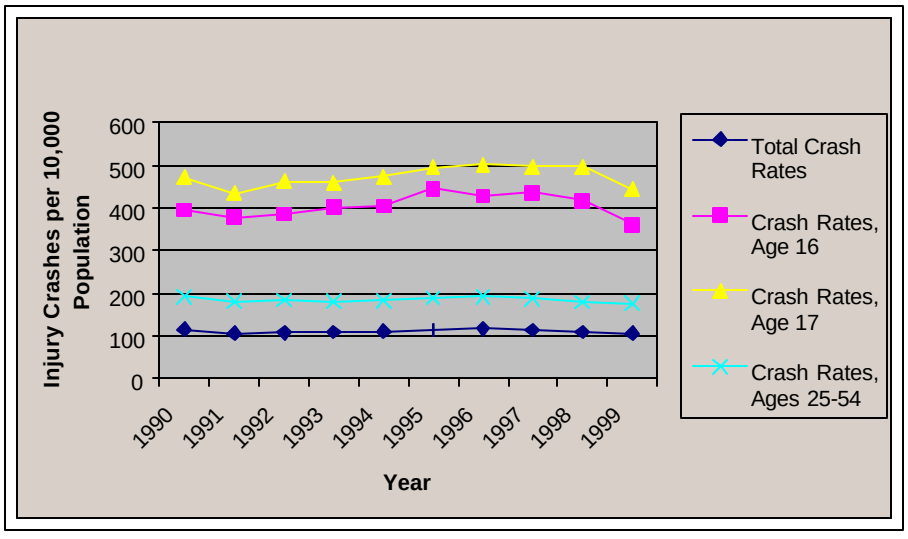


As shown in Tables 7 through 9 and Charts 7 through 9, injury, property damage only and total crashes change very little for ages 25-54. This is also true for ages 16 and 17, although slight decreases occured in both groups in the last 1-2 years.[7]

Table 7: Injury Crash Rates (Per 10,000 Population) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	Injury Crashes	Crash Rate	Injury Crashes	Crash Rate	Injury Crashes	Crash Rate	Injury Crashes	Crash Rate
1990	5755	395.38	7296	471.53	87236	191.64	125819	115.99
1991	5651	378.21	6603	435.32	81044	182.31	116652	106.72
1992	5684	386.44	7183	463.03	83930	184.21	119692	108.78
1993	6144	401.45	7020	460.31	85754	182.28	121584	109.90
1994	6284	405.81	7507	474.37	87026	183.46	123102	110.91
1995	7134	446.57	7914	495.38	90713	189.16	127961	114.89
1996	7169	429.00	8262	502.29	93614	193.28	130793	117.10
1997	7267	437.42	8507	497.52	91508	188.38	128296	114.62
1998	7047	416.75	8370	497.37	87317	179.94	123785	110.43
1999	6061	362.23	7540	444.10	85498	176.17	121078	107.56

Chart 7: Injury Crash Rates (Per 10,000 Population) by Year



[7] As is demonstrated in Tables 6 through 9, fatal crashes are rare relative to other types of crashes, hence having very little impact on overall crash rates.

Table 8 and Chart 8 present property damage only crash rates (per 10,000 population).

Table 8: Property Damage Only (PDO) Crash Rates (Per 10,000 Population) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	PDO Crashes	Crash Rate	PDO Crashes	Crash Rate	PDO Crashes	Crash Rate	PDO Crashes	Crash Rate
1990	9739	669.08	12339	797.46	164481	361.34	246225	227.00
1991	9503	636.02	11350	748.29	155217	349.16	232173	212.41
1992	9506	646.28	12009	774.12	158997	348.96	235463	214.01
1993	10336	675.35	11958	784.10	162385	345.16	239152	216.17
1994	10698	690.85	12721	803.84	167979	354.12	246061	221.68
1995	11922	746.29	13943	872.77	172893	360.53	254206	228.24
1996	12165	727.97	14444	878.12	172893	356.96	263072	235.53
1997	12435	748.50	15193	888.54	175512	361.31	257288	229.87
1998	12101	715.64	14939	887.73	171168	352.73	252845	225.56
1999	11155	666.67	14150	833.42	177990	366.74	263342	233.94

Chart 8: Property Damage Only Crash Rates (Per 10,000 Population) by Year

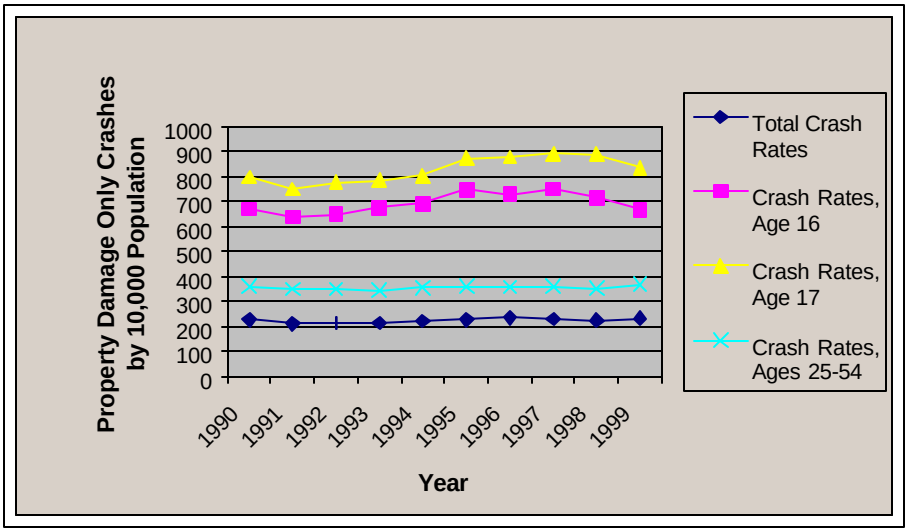
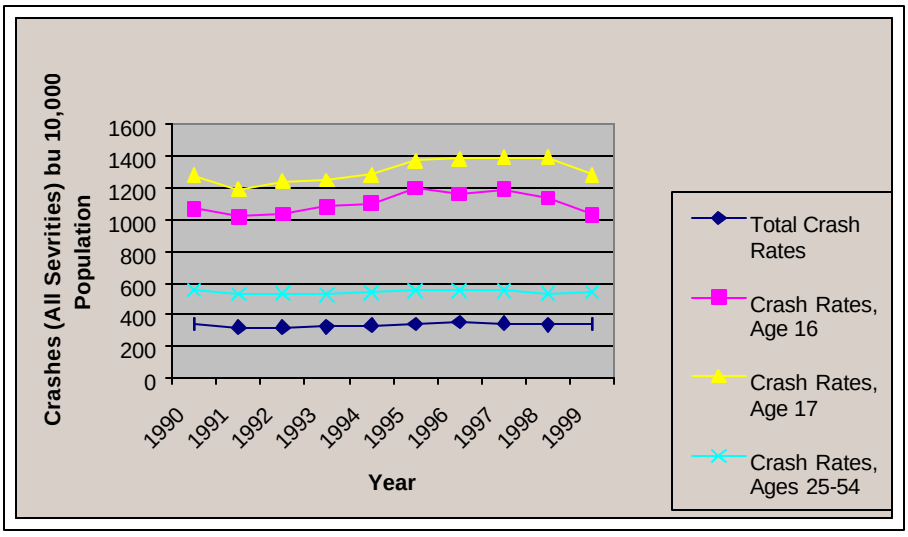


Table 9 and Chart 9 present total crash rates (per 10,000 population).

Table 9: Total Crash Rates (Per 10,000 Population) by Age and Year

	Age 16		Age 17		Ages 25-54		All Ages	
Year	Total Crashes	Crash Rate	Total Crashes	Crash Rate	Total Crashes	Crash Rate	Total Crashes	Crash Rate
1990	15540	1067.62	19703	1273.39	252655	555.05	373523	344.35
1991	15203	1017.52	18008	1187.24	237167	533.50	350277	320.45
1992	15228	1035.30	19247	1240.69	243741	534.96	356458	323.97
1993	16526	1079.81	19037	1248.27	248972	529.21	362063	327.26
1994	17025	1099.44	20294	1282.39	255790	539.23	370373	333.68
1995	19121	1196.93	21911	1371.53	264381	551.31	383383	344.22
1996	19391	1160.38	22748	1382.97	267314	551.91	395113	353.74
1997	19751	1188.87	23763	1389.74	267861	551.43	386852	345.62
1998	19195	1135.17	23364	1388.37	259309	534.37	377920	337.14
1999	17263	1031.72	21737	1280.29	264317	544.62	385704	342.65

Chart 9: Total Crash Rates (Per 10,000 Population) by Year



Pre-GDL and GDL Groups Crash Analysis

Table 10 presents crashes per 10,000 registered drivers of the pre-GDL and GDL groups in which the teenage driver was at fault, as well as the rate adjusted for the 25-54 year-old reference group. As is the case in both the pre-GDL and GDL groups, males have higher crash rates than females. However, when considered relative to the 25-54 year-old reference group, young female drivers have a higher crash rate than young males. Because male crash rates are consistently higher in most age groups (including 25-54 year-olds), young females' crash rates are particularly high when adjusted for the crash rates of their 25-54 year-old counterparts.[8]

Table 10: At Fault Crash Rates (per 10,000 Registered Drivers) of Novice Drivers, Pre-GDL and GDL Groups

	Crash Severity	Crashes of Males per 10,000 Registered Drivers	Crash Rate of Males Relative to Ages 25-54	Crashes of Females per 10,000 Registered Drivers	Crash Rate of Females Relative to Ages 25-54	Crashes of All per 10,000 Registered Drivers	Crash Rate of All Relative to Ages 25-54
Pre-GDL Group	Fatal	6.56	3.20	2.74	4.16	4.72	3.53
	Injury	654.16	3.95	552.24	4.30	605.13	4.20
	PDO	1153.46	4.71	854.21	4.03	1009.51	3.96
	Total	1814.18	4.40	1409.18	4.13	1619.36	4.05
GDL Group	Fatal	5.18	2.98	2.12	4.08	3.74	3.30
	Injury	496.19	3.80	441.92	5.11	471.37	4.33
	PDO	900.49	3.42	706.01	4.04	809.74	3.82
	Total	1401.86	3.54	1150.05	4.65	1284.86	3.99

[8] There was a significant number of crashes of which the sex of the offender was not stated. While these crashes were not counted among the male and female crashes, they were counted in the total crashes category.

Table 11 presents crashes per 10,000 registered drivers in which teen drivers (pre-GDL and GDL groups) were involved whether they were at fault or otherwise.

Table 11: Involvement Crash Rates (per 10,000 Registered Drivers) of Novice Drivers, Pre-GDL and GDL Groups

	Crash Severity	Crashes of Males per 10,000 Registered Drivers	Crash Rate of Males Relative to Ages 25-54	Crashes of Females per 10,000 Registered Drivers	Crash Rate of Females Relative to Ages 25-54	Crashes of All per 10,000 Registered Drivers	Crash Rate of All Relative to Ages 25-54
Pre-GDL Group	Fatal	8.80	2.59	4.21	3.55	6.47	2.81
	Injury	1047.57	3.45	917.38	3.79	956.89	3.50
	PDO	1928.87	3.24	1485.74	3.63	1663.15	3.31
	Total	2985.25	3.31	2407.33	3.69	2626.51	3.37
GDL Group	Fatal	5.65	1.89	2.65	2.65	4.24	2.12
	Injury	648.63	2.50	619.22	3.08	635.94	2.75
	PDO	1232.93	2.27	1063.00	2.89	1154.23	2.53
	Total	1887.21	2.34	1684.87	2.96	1794.41	2.61

Table 12 displays the amount of change when comparing the pre-GDL group to the GDL group. In all severity types, crashes involving males or in which males were at fault decreased. In crashes involving females or in which females were at fault, fatal crash rates decreased while rates of all other crash types increased. Overall crash rates of the GDL group decreased significantly, especially rates of fatal crashes.

Table 12: Percent Change of Crash Rates (Per 10,000 Registered Drivers) Relative to Ages 25-54

	Males At Fault	Males Involved	Females At Fault	Females Involved	All At Fault	All Involved
Fatal	-7%	-27%	-2%	-25%	-7%	-24%
Injury	-4%	-28%	+19%	-19%	+3%	-21%
PDO	-27%	-30%	+9%	-20%	-4%	-23%
Total	-19%	-29%	+12%	-20%	-1%	-23%

Tables 13 through 15 present crash rates per 10,000 population of the pre-GDL and GDL groups, as well as percent change of all categories. Using population estimates to calculate rates takes into consideration those individuals who do not have a license, thus the percent of change is high. In all categories, when crashes were analyzed per 10,000 population, crash rates decreased in the GDL group.

Table 13: At Fault Crash Rates (per 10,000 Population) of Novice Drivers, Pre-GDL and GDL Groups

	Crash Severity	Crashes of Males per 10,000 Population	Crash Rate of Males Relative to Ages 25-54	Crashes of Females per 10,000 Population	Crash Rate of Females Relative to Ages 25-54	Crashes of All per 10,000 Population	Crash Rate of All Relative to Ages 25-54
Pre-GDL Group	Fatal	3.23	1.60	1.32	2.19	2.30	1.81
	Injury	321.84	1.98	266.78	2.27	295.10	2.16
	PDO	567.48	2.35	412.66	2.12	492.30	2.03
	Total	892.55	2.20	680.76	2.18	789.71	2.08
GDL Group	Fatal	1.72	1.01	0.66	1.38	1.21	1.12
	Injury	164.75	1.29	138.22	1.73	152.16	1.47
	PDO	298.99	1.16	220.82	1.49	261.39	1.30
	Total	465.47	1.21	359.70	1.57	414.76	1.36

Table 14: Involvement Crash Rates (Per 10,000 Population) of Novice Drivers, Pre-GDL and GDL Groups

	Crash Severity	Crashes of Males per 10,000 Population	Crash Rate of Males Relative to Ages 25-54	Crashes of Females per 10,000 Population	Crash Rate of Females Relative to Ages 25-54	Crashes of All per 10,000 Population	Crash Rate of All Relative to Ages 25-54
Pre-GDL Group	Fatal	4.33	2.31	2.03	2.45	3.16	2.30
	Injury	515.39	2.39	443.17	2.29	466.64	2.27
	PDO	948.97	2.32	717.75	2.16	811.06	2.18
	Total	1468.69	2.34	1162.95	2.21	1280.85	2.21
GDL Group	Fatal	1.88	0.64	0.83	0.90	1.37	0.72
	Injury	215.37	0.84	193.67	1.04	205.28	0.94
	PDO	409.38	0.77	332.48	0.98	372.59	0.86
	Total	626.62	0.80	526.98	1.00	579.24	0.89

Table 15: Percent Change of Crash Rates (Per 10,000 Population) Relative to Ages 25-54

	Males At Fault	Males Involved	Females At Fault	Females Involved	All At Fault	All Involved
Fatal	-37%	-72%	-37%	-63%	-38%	-69%
Injury	-35%	-65%	-24%	-54%	-32%	-59%
PDO	-51%	-67%	-30%	-55%	-36%	-60%
Total	-45%	-66%	-28%	-55%	-35%	-60%

Table 16 presents those crashes in which a teen driver was under the influence of alcohol. As shown in the table, decreases among the GDL group were significant, and warrant further investigation. This decrease may be related to the curfew that is now a requirement of those possessing a probationary license.

Table 16: Alcohol Crash Rates (Per 10,000 Registered Drivers), Pre-GDL and GDL Groups

Crash Severity	Pre-GDL Crashes per 10,000 Registered Drivers	GDL Crashes per 10,000 Registered Drivers	Pre-GDL Crash Rate Relative to Ages 25-54	GDL Crash Rate Relative to Ages 25-54	Percent Change (Pre-GDL and GDL Rates) Relative to Reference Group
Fatal	0.74	0	1.72	0	-100%
Injury	17.82	10.98	1.08	0.80	-26%
Property Damage Only	18.86	12.48	1.22	0.90	-26%
Total	37.41	23.46	1.15	0.84	-27%

Table 17 presents crashes of novice drivers by time of day. Those hours with the largest GDL group decreases are during late night / early morning hours – some of those falling under the GDL's probationary driver curfew.[9]

Table 17: Crash Rates by Time of Day (Per 10,000 Registered Drivers), Pre-GDL and GDL Groups

Hour	Pre-GDL Crashes per 10,000 Registered Drivers	GDL Crashes per 10,000 Registered Drivers	Pre-GDL Crash Rate Relative to Ages 25-54	GDL Crash Rate Relative to Ages 25-54	Percent Change (Pre-GDL and GDL Rates Relative to Reference Group
Midnight	28.70	16.59	3.22	2.10	-35%
1 a.m.	15.61	11.10	2.15	1.72	-20%
2 a.m.	9.54	6.11	1.22	0.86	-29%
3 a.m.	5.92	5.99	1.22	1.32	+8%
4 a.m.	4.13	3.37	1.02	0.87	-15%
5 a.m.	4.45	2.87	0.61	0.42	-30%
6 a.m.	14.72	10.11	0.93	0.70	-25%
7 a.m.	114.96	91.08	3.54	3.15	-11%
8 a.m.	44.49	31.19	1.57	1.18	-25%
9 a.m.	30.97	20.21	1.41	1.01	-28%
10 a.m.	38.21	25.70	1.65	1.23	-25%
11 a.m.	55.53	39.05	1.86	1.47	-21%
Noon	72.43	53.90	1.95	1.65	-15%
1 p.m.	70.68	57.64	2.10	1.86	-12%
2 p.m.	145.47	120.03	5.10	3.38	-34%
3 p.m.	188.40	164.07	3.80	3.64	-4%
4 p.m.	145.07	1247.77	2.89	2.75	-5%
5 p.m.	138.33	117.91	2.58	2.58	-1%
6 p.m.	116.34	96.69	3.01	2.90	-4%
7 p.m.	91.32	71.74	3.37	3.01	-11%
8 p.m.	79.24	60.76	3.90	3.48	-11%
9 p.m.	77.03	62.76	4.15	3.88	-6%
10 p.m.	66.57	47.16	4.38	3.54	-19%
11 p.m.	54.55	38.68	4.33	3.57	-18%

[9] It should be noted that two new convictions were developed for the GDL curfew: The temporary curfew violation and the driver license curfew violation. In the GDL study group, there were 2 temporary curfew violations and 20 driver license curfew violations.

Pre-GDL and GDL Groups Conviction Analysis

Tables 18 through 20 present rates for select convictions[10] of the pre-GDL and GDL groups. For both males and females, speed conviction rates increased. In addition, safety belt violation convictions increased among males. For all other catgories, the GDL group saw decreases in the rates of conviction.

Table 18: Rates (Per 10,000 Registered Drivers) of Selected Convictions for Male Novice Drivers, Pre-GDL and GDL Groups

Conviction	Convictions of Males per 10,000 Registered Drivers – Pre-GDL Group	Convictions of Males per 10,000 Registered Drivers –GDL Group	Percent Change
DUI Alcohol / Liquor	28.01	26.21	-6%
Speed	786.40	798.31	+2%
Assured Clear Distance	220.87	186.56	-16%
Safety Belt Violation	211.48	242.21	+15%
Stop Sign	130.64	106.72	-18%
Failure to Yield Right of Way	134.72	97.67	-28%

Table 19: Rates (Per 10,000 Registered Drivers) of Selected Convictions for Female Novice Drivers, Pre-GDL and GDL Groups

Conviction	Convictions of Females per 10,000 Registered Drivers – Pre-GDL Group	Convictions of Females per 10,000 Registered Drivers –GDL Group	Percent Change
DUI Alcohol / Liquor	8.16	6.46	-21%
Speed	418.24	468.11	+12%
Assured Clear Distance	170.71	147.53	-14%
Safety Belt Violation	96.13	93.72	-3%
Stop Sign	77.45	76.61	<-1%
Failure to Yield Right of Way	126.28	97.53	-23%

[10] Conviction is defined as a violation/citation for that which either the defendant has entered a guilty plea (paid the fine, etc.) or is found guilty in a court of law. Hence, the conviction is reported to the Bureau of Motor Vehicles and becomes part of the individual's driving record.

Table 20: Rates (Per 10,000 Registered Drivers) of Selected Convictions for All Novice Drivers, Pre-GDL and GDL Groups

Conviction	Convictions of All per 10,000 Registered Drivers – Pre-GDL Group	Convictions of All per 10,000 Registered Drivers –GDL Group	Percent Change
DUI Alcohol / Liquor	20.21	17.03	-16%
Speed	624.39	644.83	+3%
Assured Clear Distance	200.21	168.42	-16%
Safety Belt Violation	168.16	173.19	-3%
Stop Sign	109.78	92.72	-16%
Failure to Yield Right of Way	133.39	97.60	-27%

Table 21 presents total conviction rates for pre-GDL and GDL groups. While males saw a significant decrease, females did not. The GDL group's rate as a whole, however, is less than that of the pre-GDL group.[11]

Table 21: Rates (Per 10,000 Registered Drivers) of Total Convictions of Novice Drivers, Pre-GDL and GDL Groups

	Convictions of Males per 10,000 Registered Drivers	Convictions of Females per 10,000 Registered Drivers	Convictions of All per 10,000 Registered Drivers
Pre-GDL Group	2962.67	1467.32	2442.18
GDL Group	2601.13	1459.25	2070.37
Percent Change	-12%	-1%	-15%

[11] There was a significant number of convictions of which the sex of the offender was not stated. While these convictions were not counted among the male and female convictions, they were counted in the total convictions category.

Pre-GDL and GDL Groups Suspension Analysis

In addition to crash and conviction data, suspension data were also analyzed as a part of this evaluation. Changes in suspensions under the GDL law are twofold: first, the courts are utilizing three new suspensions, the Probation 1, Probation 2 and Probation DUI. Many convictions that once fell under the other categories now fall under these new suspensions; second, the GDL law allows courts to intervene in a young person's driving career if they have exhibited driving or non-driving problem behaviors, such as truancy. Young drivers are now held to stricter standards in terms of convictions, the point system and suspensions.

This evaluation found a large increase in suspensions among the GDL group (see Table 22). Because standards for suspension have been created, a large increase in suspensions in relation to a reduction in crashes and convictions for the GDL group is an indication that the new suspension guidelines are being utilized. Hence, problem young drivers are receiving intervention earlier in their driving career.[12]

Table 22: Total Suspensions (per 10,000 Registered Drivers) for Novice Drivers, Pre-GDL and GDL Groups

	Males	Females	All
Pre-GDL Group	272.28	69.87	132.29
GDL Group	629.24	303.94	478.04
% Change	+131%	+335%	+261%

[12] There were a significant number of suspensions of which the sex of the offender was not stated. While these suspensions were not counted among the male and female suspensions, they were counted in the total suspensions category.

Limitations of the Study

There are several limitations to this study. First, the time frame and how that affects data availability limit the study. Two years was inadequate time to evaluate the impact of the law, especially one with many components like the GDL. In addition, like so many other states, there is a time lag in crash and conviction data, so the GDL group analysis consisted of only 14 months of data. It is important that the long-term impact of the GDL law be measured as well. Also, the evaluation requirements of the law and the design of the study do not lend themselves to specific parts of the law. That is, it is impossible to attribute any success to each aspect of the law; it can only be speculated what parts are responsible for what results.

Recommendations for Future Research

The limitations mentioned above indicate the value of this study, beyond measuring short-term impact. This study points to specific areas within the GDL law that warrant further study. This preliminary study leads to directions where research could provide an even clearer picture of the GDL's effects and young driver behaviors.

It would be valuable to follow the model of several other studies to evaluate each aspect of the law, the curfews, class time, etc, to see what is most effective in making novice drivers safer drivers. Also, analyzing licensure rates and exam pass / fail rates would show whether less young people are taking driver training (that is, waiting until 18 to get a license, thus avoiding the GDL training requirements) and whether GDL's increased instruction leads to higher passing rates in driver exams. In addition, it would be worthwhile to examine whether the personal miles driven by GDL drivers has decreased as a result of curfews and the GDL in general, and how this affects rates of conviction, crashes and suspensions.

To learn more about the long-term effects of the GDL law, the evaluation presented in this report should be performed again in five years. However, in order to evaluate the law in the more distant future, changes must be made in the ways crash, conviction and suspension data are collected and stored. Since suspension and conviction data drop off of individual driving records after approximately three years, a study of these issues looking at more than three years of data would be difficult, if not impossible. Making historical driving records accessible to researchers would remedy this limitation.

Conclusion

Ohio's Graduated Driver License law appears to be having a positive effect on young drivers two years after its effective date. In looking at overall trends, youthful driver crashes have decreased in the last one to two years. When comparing pre-GDL and GDL study groups, the involvement crash rate of the GDL group is 23% less than that of their pre-GDL counterparts; the at-fault crash rate of the GDL group is 1% less than the pre-GDL group. This effect seems most apparent among male novice drivers. In addition, the involvement fatal crash rate of the GDL group is 24% less than that of their pre-GDL counterparts; and the at-fault fatal crash rates are 7% less than that of the pre-GDL group. This decrease translates into a saving of approximately 30 lives. There have also been reductions in alcohol-related crashes and crashes during "curfew hours". The conviction rate of the GDL group is 15% less than that of the pre-GDL group. With GDL's introduction of a new suspension and changes in rules for suspension, rates of the GDL group are dramatically higher than that of the pre-GDL group. This indicates that GDL suspensions are being utilized by Ohio's judges, and that young problem drivers receive intervention earlier in their driving careers.

More time must pass before having a clear idea of effectiveness / impact of the GDL law. However, the basis of these future evaluations exist in this study and in the data that is continuously collected by ODPS. While the law is still in its early stages and it is impossible to determine its full impact at this time, the early reductions in convictions and crashes, as well as the large increase in suspensions, mentioned are encouraging, and lend themselves well to the argument in favor of a GDL law in every state.

Source

Ulmer, R.G., Preusser, D.F., Ferguson, S.A., & Williams, A.F. (1999) Teenage Crash Reduction Associated with Delayed Licensure in Louisiana. *Journal of Safety Research, 30,1* ,31-38