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Delaware's Graduated Driver's License Statute: An Evaluation

prepared for
the Delaware Office of Highway Safety

by

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Executive Summary

In July, 1999, Delaware adopted a new statute which provided for a graduated driver's license. The statute focuses on those individuals' ages 16 and 17 who are applying for their first driver's license. The goal is to give those individuals the time and supervision necessary to build their driving skills and improve their decision-making within a lower risk environment.

The statute was expected to meet this goal in a number of ways. First, the individual must meet certain standards with respect to training and exhibit knowledge of the rules of the road and basic skills in operating a motor vehicle. Second, for a period of time they can only drive when supervised by a qualified person. Third, after gaining a specified amount of experience, they may drive unsupervised but with restrictions as to the time of day. There are also restrictions with respect to carrying passengers.

This process was expected to improve the individual's driving skills, instill a sense of responsibility, sharpen their judgment, and promote strict observance of the rules of the road. If the statute was successful, the crash rates for these drivers should decline in comparison with similar drivers from time periods before the creation of this statute. In addition, it would be reasonable to expect that the rate of traffic violations should also decline for this age group given the extended and well-supervised training the individual has received. Finally, the exposure of the individual to certain risks such as driving late at night is likely to have also reduced the risk of a crash.

In this study, using data from the Division of Motor Vehicles, the Delaware State Police, and DELJIS from the period 1994-2008, the crash rates and violation rates for younger drivers ages 16-24 are calculated. A decrease in the rates for 16 year olds is expected when comparing those from 1994-1999 to those from 2000-2008.

The results, which apply to 16 year-old drivers, show that the statute has had the expected effect. Of particular interest are the following:

- Crash rates for drivers decreased by 30.8%;
- Crash rates involving personal injury decreased by 30.1%;
- Crash rates during the period 10pm-6am decreased by 59.1%;

- Crash rates involving male drivers decreased by 35.1%;
- Crash rates involving female drivers decreased by 28.8%.
- Violation rates for drivers of age 16 decreased by 17.4%;
- Violations involving male drivers decreased by 20.6%;
- Violations involving female drivers decreased by 25.2%.

The results for 16-year old drivers declined as expected. It would appear that the primary factor leading to the declines in crash rates are the supervision and the restricted driving hours which lowers exposure and avoids the high risk times.

There is no evidence found in this data that the experience and supervision received in the GDL program translates into fewer crashes one year later when they are 17. The 16 year-old GDL group from 2000 looks very much like all other 17 year-old groups with respect to crash rates.

The violation data supports the idea that exposure is increasing rapidly in the first three to four years of driving before moderating and very slowly declining as a driver ages.

Introduction

In July, 1999, Delaware adopted a new statute which provided for a graduated driver's permit process. The statute focuses on those individuals of ages 16 and 17 who are applying for their first driver's license. The goal is to give those individuals the time and supervision necessary to build their driving skills and improve their decision-making within a lower risk environment.

The statute requires that a number of pre-conditions be met as part of the application process. Those pre-conditions include the following:

- Successfully completing a driver's education course;
- Passing the written and road test;
- Certified by the driver's education teacher;
- Application signed by a qualified sponsor.

If the applicant is found qualified, a Level 1 Learners Permit is issued. That permit comes with several restrictions including the following:

- Mandatory supervision by a qualified person;
- Only the supervisor can be in the front seat during certain times of the day;
- For the first 6 months, the individual must be supervised at all times when driving;
- After 6 months, the individual can only drive between 6am and 10pm unsupervised (with a few exceptions);
- Drivers are restricted to carrying just one passenger in addition to the supervisor during the first six months of driving (an exception is made for family members). In the final six months, only a single passenger is permitted when the driver is unsupervised.

Basically, the individual must meet certain standards with respect to training and exhibit knowledge of the rules of the road and basic skills in operating a motor vehicle. Second, for a period of time they can only drive when supervised by a qualified person. Third, after gaining a specified amount of experience, they may drive unsupervised but with restrictions as to the time of day. At the end of the first year, their GDL permit becomes an unrestricted Class D license, providing the driver has not had his/her license suspended or revoked. Hopefully, by this time, the GDL driver has gained enough experience and maturity to reduce the risk of being involved in a crash.

This report contains the results from an evaluation of the effectiveness of the statute. The basic design is referred to as a pre-post design. Data gathered from the time prior to the implementation of the statute will be compared with data gathered after the statute was put in place. The two periods are 1994-1999 and 2000-2008. The primary focus will be on the 16-year old driver since that group is required to enter the program. The 17-year old group is a mixture since most will have come through the GDL program the year before. Some may currently be in the program, and still others may have held an out-of-state license for a full 12 months and can apply for a Class D license. However, data will be presented showing results for all ages 16-24.

There are three primary data sources used in this evaluation. The first was a data set provided by the Division of Motor Vehicles. It contains a record for each licensed driver who was in the age range 16-24 in 1994-2008. Many of these drivers are no longer in the state, and their licenses will have expired. The data provided includes the date the license was first issued, the expiration date, the date of birth, gender, and the class of license. The class of license and the expiration date will be updated as licenses are reissued. The other data remains fixed. This data set is important because it allows calculation of the number of drivers in each age group during each year of the period 1994-2008 and thus the ability to calculate a rate for each variable in the evaluation years.

The second primary data source is the crash file provided by the Delaware State Police. It contains a record for each crash, the date and hour of occurrence, the hour of occurrence, injury indicator, gender, age, and date of birth of the driver, state of residence and the state of license. This data was provided in two separate files. The first included data from paper files which covered 1994-2006. The data from 2004-2006 was transitional and incomplete. The second file was derived from their automated system and covered the period 2004-2009. Data from 2004 to 2006 found in both files were combined in the analysis. Data from 2009 was not included since the second half of 2009 was not yet available. During the analysis only data where the driver was from Delaware and had a Delaware driver license was included. This accounted for roughly 80% of the crashes.

The final data is derived from DELJIS. This is an extract which contains every traffic violation that occurred during the study period. It contains a record for each violation, the date of the event, date of birth and age of the offender as well as gender, the offender's state and the state of the license.

The report contains four sections following this introduction. The first section deals with the measurement of drivers who are residents of Delaware during the 1994 to 2008 period. These data, supplied by DMV, are crucial for calculating appropriate rates.

The second section contains an analysis of the crash data provided by the Delaware State Police. This data is critical in evaluating the impact of the GDL statute.

The third section covers the traffic violations information supplied by DELJIS. This information is used primarily to discover any relationship between the GDL statute and driving behavior.

The fourth and final section provides some observations about what has been learned as a result of this evaluation.

The Appendix contains critical parts of the GDL statute and a few additional tables.

Drivers at Risk

One of the most critical pieces of data is the number of licensed drivers in the State of Delaware during each year of the study. This data is used in the computation of rates with respect to crashes and traffic violations for all of the interested groups. Table 2.1 contains the final numbers used throughout the study.

Table 2.1
Age Distribution of Drivers

Age	1994	1995	1996	1997	1998	1999
16	5497	5646	5889	5974	6053	6109
17	6967	7157	7434	7707	7302	7601
18	7249	7446	7779	7943	8164	8140
19	7760	7971	8183	8240	8726	8670
20	8085	7880	8135	8491	8562	8904
21	7857	7659	8067	7968	8450	8492
22	8722	8502	8379	8536	8226	8652
23	10040	9786	8740	8680	8690	8508
24	10703	10433	9530	9180	8962	8937

Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware Division of Motor Vehicles, Dover DE
Federal Highway Administration, USDOT

Table 1 (continued)
Age Distribution of Drivers

Age	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	6132	6063	6088	6151	6240	6381	6486	6920	6539
17	7456	7274	7431	7402	7627	7950	7852	8563	7805
18	8235	8043	8012	8243	8203	8386	8800	9197	8803
19	8807	8915	8877	8921	9076	9132	9240	9885	9498
20	9136	9298	9418	9433	9466	9715	9725	9897	10354
21	8951	9195	9365	9486	9494	9632	9970	10016	10796
22	8722	9189	9544	9744	9808	9969	9985	10374	10417
23	8926	9082	9608	10130	10063	10397	10368	10441	10841
24	8814	9324	9553	10135	10505	10604	10798	10970	11101

Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware Division of Motor Vehicles, Dover DE
Federal Highway Administration, USDOT

Two independent sources were employed in creating this set of estimates. The Federal Highway Administration (FHWA) published an estimate of licensed Delaware drivers from 1994 through 2008. These estimates were obtained from the Delaware Division of Motor Vehicles (DMV) by FWHA. There were notable inconsistencies between years which were not explained in the documentation.

The DMV supplied the study with an extract covering the years 1994-2008 as well. The data set contained a record for any driver in the appropriate age range, namely 16 to 24 that held a license in any one of the target years. This amounted to selecting all licenses issued to persons with a date of birth between 01/01/70 and 10/05/93. Given the date of birth, the year the license was originally issued and the expiration date, it was straightforward to develop a count of drivers with an active license in the year of interest. However, these estimates are an upper estimate since we cannot determine if the person was living in Delaware during all four years of the license period. The same problem exists for those who were issued a license in the state, left the state for a number of years, and were issued a license when they returned. Some of these issues are in all likelihood present in the estimates sent to FHWA by DMV.

A third method used as a backup was the application of national data on the percentage of persons by age group with a driver's license to the latest census estimates of population by age and gender. While perhaps the least precise, it is a useful way of verifying the results from the other sources.

Crashes

The primary measure used to indicate the safety record of a particular class of drivers is their crash rate. The rate is expressed as the number of crashes for the class of interest divided by the number of drivers in the class. For convenience the result is usually multiplied by either 100 or 1000. Here the rate is expressed as per 1000 drivers in the class. This is a simple concept in theory but a bit more complex in practice.

First, the number of crashes involving drivers of a specific age has to be extracted from existing information systems. Those crash reports have to be screened for the age of the driver and the state of residence. Only crashes with drivers who are residents of Delaware are included in the study. The second complication is a major change in the crash reporting system which involved both systems, paper and automated, in the years 2004 and 2006. This situation required merging the two systems during those three years when they were operating in parallel to some degree. This could have affected the data in some way which cannot be taken into account. The counts derived from the two systems are found in Table 3.1, below.

Table 3.1
Crashes
by Age of Driver and Year

Age	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	803	909	948	1005	1001	955	596	623	621	533	535	495	454	415	372
17	872	957	1027	1110	1236	1030	998	1062	1087	1076	942	970	981	1016	908
18	771	865	1000	1010	1109	1160	1116	1034	1055	1006	1018	931	1033	1084	1030
19	717	776	864	884	823	830	969	885	961	943	857	865	869	973	865
20	594	740	715	740	756	785	847	859	852	829	793	785	809	791	813
21	609	711	747	658	658	737	778	806	883	797	753	730	762	797	740
22	638	629	662	643	640	688	675	747	798	815	729	712	712	745	752
23	731	660	623	590	591	641	633	616	671	687	719	622	718	706	652
24	642	728	656	592	527	611	571	540	626	630	680	645	693	689	696

Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware State Police, Dover DE.

The table shows the number of crashes involving drivers of ages 16 through 24. While the GDL statute primarily affects 16 year-old drivers, a portion of 17 year-old drivers are affected

as well. The statute does not affect 18-year old drivers and older drivers which are provided here for purposes of contrast.[1]

Since the statute was implemented in 1999, it is readily apparent that the law had an impact even when considering just the raw crash data. In 1999, 16 year-old drivers residing in Delaware were involved in 955 crashes while driving. After implementation of the statute the number of crashes attributable to these drivers fell 37.6% to 596 in 2000. Looking along the row it is clear that the number of crashes did not return to the levels observed in the 1994-1999 levels. It also appears that the general trend is downward over the period 2000-2008. If one examines the same data for 17 year-old drivers, the pattern is different. The number of crashes is not substantively different during the two periods before and after GDL implementation. However, it is important to note that in the period before GDL, the 16 year-old drivers were in similar numbers of crashes as the 17 year-old drivers in spite of the fact that the exposure of the latter was undoubtedly higher.

A more precise way of gauging the impact of the GDL statute is to examine the crash rate. By looking at the rate, any effect caused by a change in the number of drivers at risk is taken into account. The rates are found in Table 3.2, below.

Table 3.2
Crash Rate
by Age of Driver and Year
(per 1000 drivers)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	146.1	161.0	161.0	168.2	165.4	156.3	97.2	102.7	102.0	86.7	85.7	77.6	70.0	60.0	56.9
17	125.2	133.7	138.1	144.0	169.3	135.5	133.9	146.0	146.3	145.4	123.5	122.0	124.9	118.7	116.3
18	106.4	116.2	128.6	127.2	135.8	142.5	135.5	128.6	131.7	122.0	124.1	111.0	117.4	117.9	117.0
19	92.4	97.4	105.6	107.3	94.3	95.7	110.0	99.3	108.3	105.7	94.4	94.7	94.0	98.4	91.1
20	73.5	93.9	87.9	87.2	88.3	88.2	92.7	92.4	90.5	87.9	83.8	80.8	83.2	79.9	78.5
21	77.5	92.8	92.6	82.6	77.9	86.8	86.9	87.7	94.3	84.0	79.3	75.8	76.4	79.6	68.5
22	73.1	74.0	79.0	75.3	77.8	79.5	77.4	81.3	83.6	83.6	74.3	71.4	71.3	71.8	72.2
23	72.8	67.4	71.3	68.0	68.0	75.3	70.9	67.8	69.8	67.8	71.4	59.8	69.3	67.6	60.1
24	60.0	69.8	68.8	64.5	58.8	68.4	64.8	57.9	65.5	62.2	64.7	60.8	64.2	62.8	62.7

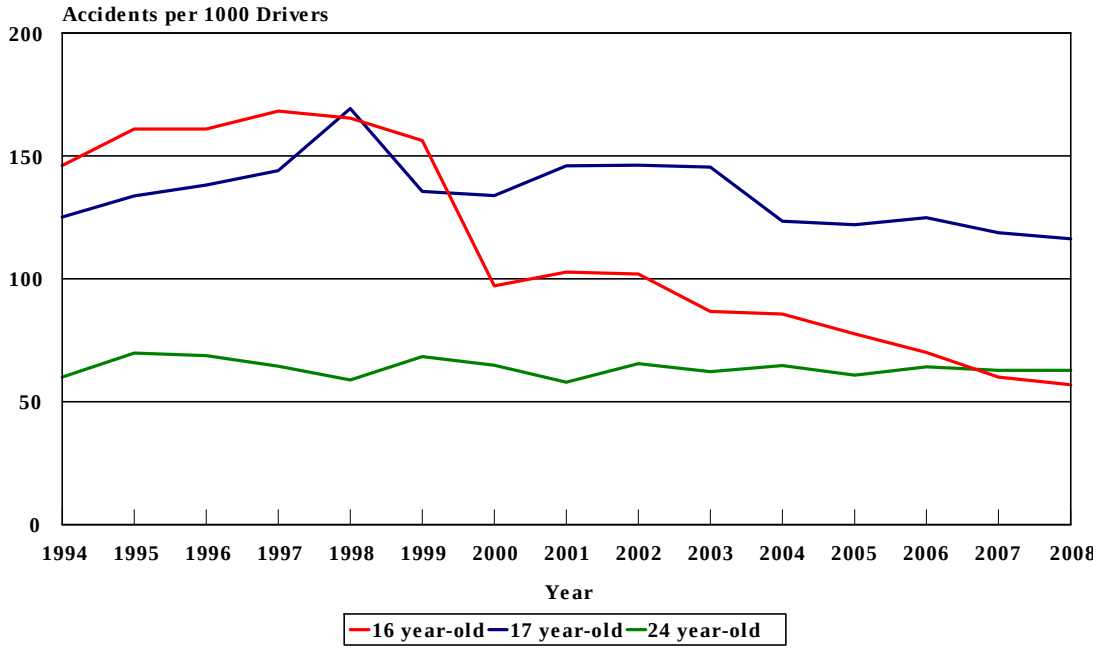
Source: Center for Applied Demography & Survey Research, University of Delaware

The first point is that the crash rate for 16 year-old drivers mirrors the data shown in Table 1. The rate for this group falls from 156.3 to 97.2 (37.8%) when GDL was implemented.

[1] The 1999 calendar year data contains 85% non-GDL drivers. The 2000 calendar year data contains 85% GDL drivers. Using the fiscal year would find 54% in the program and 46% out of it. The calendar year data provides a better estimate although one which underestimates the impact of the program.

This lower rate is at first maintained and then slowly declines through 2008. The rates associated with 17 year-old drivers are now substantially higher than observed for the younger group. Prior to the introduction of the program, the rates for 16 year-old drivers exceeded those for the 17 year-old drivers by about 13.3%. It is also quite clear that the crash rates roughly peak at 17 and decline as the driver reaches age 24. At age 24 the crash rate is roughly cut in half from that observed at age 18. The crash rate during the period before GDL was considerably higher for 16 year-old drivers when compared to 17 year-old drivers.

Figure 3.1
Crash Rates
by Age of Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

Probably the most interesting pattern shown in Figure 3.1 is that the lower rates observed at age 16 after GDL was implemented do not carry over into age 17. For example, the rate for drivers aged 16 in 2000 was 97.2. However in 2001, the rate at age 17 is 146.0. This group contains a large majority of those who were 16 the year before. If the reduction in the rate shown for GDL was simply due to improved driving skills, then the reduction should have carried forward. However, if the reduction was derived from fewer miles driven given constraints of the license and the supervisor, the reduction in rate is temporary. These data suggest that the latter is the case. Reduced exposure produced the reduction in crashes. The impact of experience is shown in the reduced rates in general as drivers age 16 to age 24 shown throughout the table.

Table 3.3
Crash Rate
by Cohort and Year
(per 1000 drivers)

	1997	1998	1999	Average 1997-99		2000	2001	2002	Average 2000-02		Net
16	168.2	165.4	156.3	163.3		97.2	102.7	102.0	100.7		-62.7
17	169.3	135.5	133.9	146.2		146.0	146.3	145.4	145.9		-0.3
18	142.5	135.5	128.6	135.5		131.7	122.0	124.1	125.9		-9.6
19	110.0	99.3	108.3	105.9		105.7	94.4	94.7	98.3		-7.6
20	92.4	90.5	87.9	90.2		83.8	80.8	83.2	82.6		-7.7
21	94.3	84.0	79.3	85.9		75.8	76.4	79.6	77.3		-8.6
22	83.6	74.3	71.4	76.5		71.3	71.8	72.2	71.8		-4.7

Source: Center for Applied Demography & Survey Research, University of Delaware

In Table 3.3 above, the three years before the implementation of GDL are compared to the three years after implementation. In the 1997 column are displayed the crash rates for those who were 16 years old in 1997 as they age through the next six years. Granted the people in the cohort change somewhat over time; however, it should be a good approximation of the likely performance over time. The average results for the first three cohorts are shown in the fourth column. The three cohorts following GDL implementation are treated similarly, yielding another three year average. The column labeled "Net" shows a very large difference for 16 year-old drivers of -62.7 (38.4%) for the post GDL period. There is almost no impact on the GDL drivers when they become 17, but a gradual improvement over time, as the members of the cohort age, is apparent.

Using the data contained in Table 3.2 and graphed in Figure 3.1, it is clear that there is both a program effect and a general downward trend as well. To disentangle these two effects, the data was modeled using ordinary least squares (OLS) regression. This analysis estimates the GDL effect to be -45.962 and the annual decline as -4.215 for the 16 year-old drivers (adj. R^2=.865, F=38.089, Sig.=.000). This allows the computation of an adjusted percentage change between 1999 and 2000 of 30.82% compared to the 37.8% computed earlier. The difference is the long term downward trend has been removed leaving only the GDL statute effect.

The 17 year-old driver's performance produced an annual decline of -1.25 and a GDL effect of 3.01, a small increase in the crash rate.

While all crashes and crash rates are important in understanding the impact of GDL, those that involve personal injury are of particular concern. Fatal injuries are not singled out because of the small numbers, less than seven a year for any of the age groups in any year, and the high volatility obscures any relationship to GDL.

Table 3.4
Personal Injury Crashes
by Age of Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	162	187	177	209	217	203	142	124	130	84	93	92	116	123	88
17	154	166	193	229	277	233	233	233	214	204	150	213	236	286	225
18	135	145	199	218	230	228	206	244	214	177	200	222	276	267	275
19	134	163	167	179	171	196	191	173	193	165	153	205	239	259	262
20	118	153	142	149	176	164	182	179	161	146	161	202	207	224	234
21	108	126	152	126	132	144	179	176	169	131	141	168	232	246	206
22	116	161	109	134	139	126	160	146	152	139	131	161	199	204	218
23	149	114	125	119	120	125	124	118	149	123	119	139	194	202	189
24	109	131	120	101	92	128	119	108	149	126	128	152	195	195	186

Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware State Police, Dover DE.

The number of crashes involving personal injuries is found in Table 3.4, above. Prior to the introduction of GDL, an average of 192.5 personal injury crashes occurred annually for 16 year-old drivers. That subset of crashes accounted for just over 20% of all crashes involving this group of drivers.

When GDL came into play in 1999, there was a 30% drop in the number of personal injury crashes for the 16 year-old group. This reduction is somewhat less of a decrease than the 38% drop in all crashes for GDL drivers. However, these numbers are somewhat volatile as can be seen in the personal injury crashes that occurred in 2001 through 2008. The important point is that with the reduction in exposure and the addition of on-board supervision for at least half the year, personal injury crashes and thus the related costs will fall as well. It is also important to note that the reductions were sustained across 2001-2008 period.

The patterns observed earlier are present in this data as well. Once the GDL period is over, there is virtually no difference for the GDL drivers when they turn 17 years of age. When the GDL driver gains a standard class D license, then the supervision is not present and their exposure on the roads becomes consistent with the 17 year-olds from the pre-GDL times. The number of personal injury crashes falls continuously with the driver's age. It is somewhat curious to see the increases in crashes (unadjusted for drivers) from 2005 through 2008. Since this period

was one of sharply rising gasoline prices and presumably reductions in miles driven, exposure should have been less.

Table 3.5
Personal Injury Crash Rate
by Age of Driver and Year
(per 1000 drivers)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	29.5	33.1	30.1	35.0	35.8	33.2	23.2	20.5	21.4	13.7	14.9	14.4	17.9	17.8	13.5
17	22.1	23.2	26.0	29.7	37.9	30.7	31.3	32.0	28.8	27.6	19.7	26.8	30.1	33.4	28.8
18	18.6	19.5	25.6	27.4	28.2	28.0	25.0	30.3	26.7	21.5	24.4	26.5	31.4	29.0	31.2
19	17.3	20.4	20.4	21.7	19.6	22.6	21.7	19.4	21.7	18.5	16.9	22.4	25.9	26.2	27.6
20	14.6	19.4	17.5	17.5	20.6	18.4	19.9	19.3	17.1	15.5	17.0	20.8	21.3	22.6	22.6
21	13.7	16.5	18.8	15.8	15.6	17.0	20.0	19.1	18.0	13.8	14.9	17.4	23.3	24.6	19.1
22	13.3	18.9	13.0	15.7	16.9	14.6	18.3	15.9	15.9	14.3	13.4	16.2	19.9	19.7	20.9
23	14.8	11.6	14.3	13.7	13.8	14.7	13.9	13.0	15.5	12.1	11.8	13.4	18.7	19.3	17.4
24	10.2	12.6	12.6	11.0	10.3	14.3	13.5	11.6	15.6	12.4	12.2	14.3	18.1	17.8	16.8

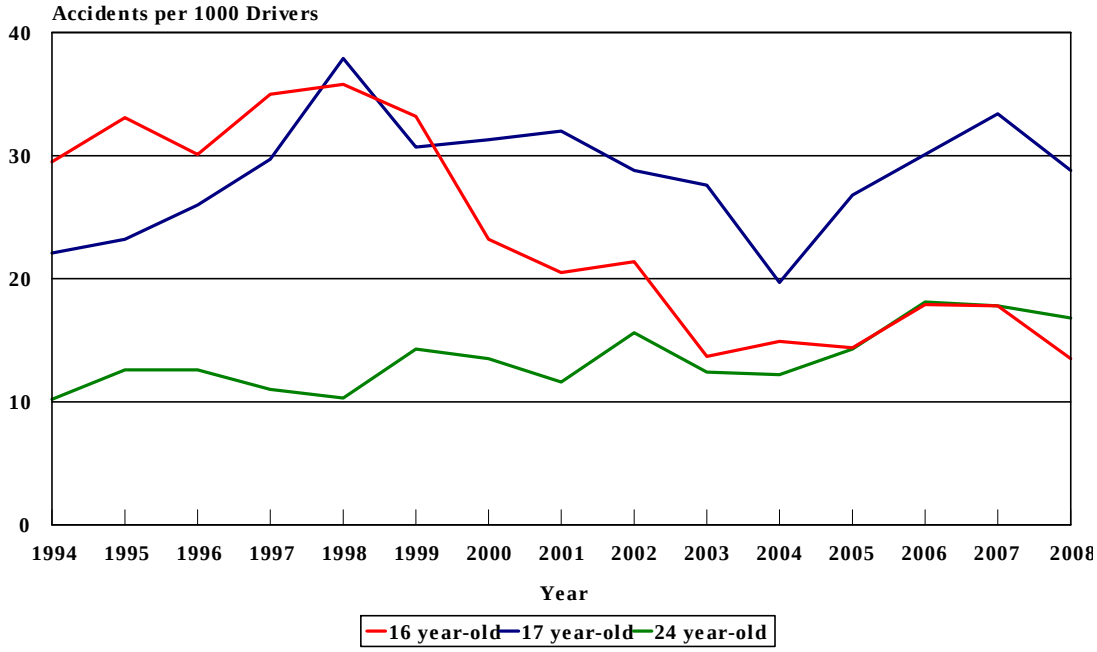
Source: Center for Applied Demography & Survey Research, University of Delaware

These results should also be converted into personal injury crash rates by adjusting for the number of drivers at risk. These rates are found in Table 3.5. The crash rate calculations confirm the observations from the previous table. The GDL drivers were involved in 30% less personal injury crashes when compared to the 16 year-old drivers in 1999. As expected, the reduced rate for that group does not carry through into the next year since exposure is increasing.

Figure 3.2 below shows that the personal injury crash rate for 17 year-old drivers was substantially lower in comparison with the 16 year-old drivers in the pre-GDL period (red above blue). This suggests that the reduced exposure for GDL drivers still provided sufficient experience to meet the traditional personal injury crash rates a year later.

In contrast to the data for crashes overall, the personal injury crash rates for both 17 year-old drivers and 24 year-old drivers have been rising. In the case of the older group the rate has increased significantly from 13.5 to 16.8 over the past 8 years.

Figure 3.2
Personal Injury Crash Rates
by Age of Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

Using the data contained in Table 3.5 and graphed in Figure 3.2, it is clear that the program effect and the general downward trend are present, although more obvious in the GDL drivers. The two effects were isolated using ordinary least squares (OLS) regression. This analysis sets the GDL effect to be -11.681 and the annual decline as -.483 for the 16 year-old drivers (adj. R^2=.675, F=13.037, Sig.=.000).). This also allows the computation of an adjusted percentage change between 1999 and 2000 of 36.99% compared to the 30.1% computed earlier. The difference is the long term downward trend has been removed leaving only the GDL statute effect.

The 17 year-old driver's performance produced an annual increase of 7.89 in the crash rate and a GDL effect of -3.55, neither of which were statistically significant.

In Table 3.6 below, the three years before the implementation of GDL are compared to the three years after implementation. In the 1997 column are displayed the personal injury crash rates for those who were 16 years old in 1997, and as they age through the next six years. While the people in the cohort will change somewhat as time passes, it should be a good measure of the

likely results over time. The average results for the first three cohorts are shown in the fourth column. The three cohorts following GDL implementation are treated similarly, yielding another three year average. The column labeled "Net" shows a large difference for 16 year-old drivers of -13.0 (37.5%) for the post GDL period. The impact on the GDL drivers when they become 17 is much less -3.8. By the time these cohorts age by six years, they show increases and these are reflecting the increases post 2005 mentioned earlier.

Table 3.6
Personal Injury Crash Rate
By Cohort and Year
(per 1000 drivers)

	1997	1998	1999	Average 1997-99		2000	2001	2002	Average 2000-02		Net
16	35.0	35.8	33.2	34.7		23.2	20.5	21.4	21.7		-13.0
17	37.9	30.7	31.3	33.3		32.0	28.8	27.6	29.5		-3.8
18	28.0	25.0	30.3	27.8		26.7	21.5	24.4	24.2		-3.6
19	21.7	19.4	21.7	20.9		18.5	16.9	22.4	19.3		-1.7
20	19.3	17.1	15.5	17.3		17.0	20.8	21.3	19.7		2.4
21	18.0	13.8	14.9	15.6		17.4	23.3	24.6	21.8		6.2
22	14.3	13.4	16.2	14.6		19.9	19.7	20.9	20.2		5.6

Source: Center for Applied Demography & Survey Research, University of Delaware

Another area of interest is the potential for gender differences in the GDL program. The crash information for 16-24 year-old male drivers is contained in Table 3.7, below.

Table 3.7
Crashes
by Age of Male Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	423	495	500	538	532	519	311	321	322	274	273	237	224	204	180
17	510	550	582	631	699	548	565	564	557	586	498	532	471	505	479
18	475	533	583	611	645	653	664	626	585	570	555	516	574	559	582
19	414	445	537	511	509	483	576	524	567	542	492	448	438	560	484
20	360	417	436	423	402	429	482	463	427	476	427	455	445	434	462
21	377	412	423	375	376	423	420	420	471	434	438	417	403	417	388
22	387	372	374	342	351	408	383	386	382	416	421	392	393	411	384
23	435	381	345	345	341	349	355	337	359	367	385	333	417	395	327
24	379	411	394	349	295	329	313	289	346	342	356	339	357	402	361

Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware State Police, Dover DE.

The number of crashes attributed to 16 year-old male drivers fell by 40.1% after the GDL statute was implemented, and that new level has been sustained or fallen further over the last eight years. Since the beginning of the GDL program in July, 1999, the reported crashes have fallen by more than 42% as of 2008.

Table 3.8
Crash Rate
by Age of Male Driver and Year
(per 1000 drivers)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	162.3	185.1	179.9	189.1	186.6	180.9	108.2	100.1	113.2	95.7	95.0	80.7	74.8	63.0	59.5
17	148.8	156.4	155.1	162.6	191.5	146.6	154.7	153.1	155.2	166.1	135.7	137.8	126.9	120.6	129.1
18	128.4	140.4	150.3	152.0	158.0	161.8	161.6	154.5	145.6	140.5	139.7	126.1	130.9	124.5	132.2
19	105.4	110.4	130.0	122.6	116.7	109.9	129.9	119.6	127.1	118.8	108.2	99.5	95.0	110.5	102.7
20	87.4	103.8	105.3	98.8	93.9	94.4	104.4	100.3	88.7	100.4	87.8	92.6	91.6	88.2	87.8
21	95.3	106.8	104.8	93.9	89.0	100.6	92.9	91.1	100.8	90.6	92.9	84.9	80.3	82.7	70.7
22	88.1	86.8	89.5	80.5	85.3	95.3	89.3	84.1	80.5	86.1	85.7	79.3	77.7	79.9	73.4
23	87.0	78.1	79.0	79.9	78.5	82.9	80.7	72.5	75.0	72.6	78.3	64.1	81.0	75.9	59.7
24	70.3	78.2	81.9	75.4	65.8	74.3	72.2	60.9	74.0	67.5	69.0	64.9	66.3	72.6	64.8

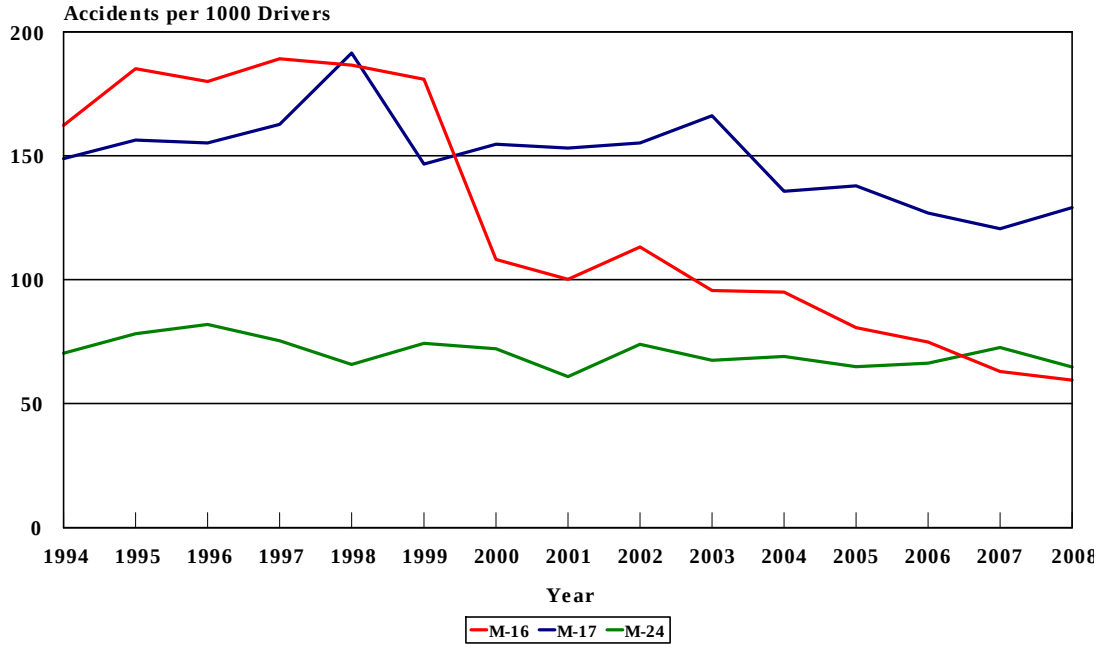
Source: Center for Applied Demography & Survey Research, University of Delaware

In Table 3.8, the substantial reduction in crashes from 1999 to 2000 for the male GDL driver is replicated in the crash rate which accounts for any change in the number of drivers. The crash rates for 17 and 18 year-old male drivers also fall substantially from 2000 to 2008. For these two ages crash rates will be cut nearly in half by the time they are 24 years of age.

Using the data contained in Table 3.8 and graphed in Figure 3.3, it is clear that both the program effect and the general downward trend are present. The two effects were isolated using ordinary least squares (OLS) regression. This analysis sets the GDL effect for men to be -59.506 and the annual decline as -4.446 for the 16 year-old drivers (R^2=.897, F=41.707, Sig.=.000). This also allows the computation of an adjusted percentage change between 1999 and 2000 of 35.1% compared to the nominal 40.1% computed earlier. The difference is the long term downward trend has been removed leaving only the GDL statute effect.

The 17 year-old driver's performance produced an annual increase of -3.018 and a GDL effect of 4.60, neither of which was statistically significant.

Figure 3.3
Crash Rates
by Age of Male Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

Table 3.9
Crashes
by Age of Female Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	380	414	448	467	468	436	285	302	299	259	262	258	230	211	191
17	361	407	445	479	536	482	433	498	530	490	444	438	509	511	429
18	296	331	417	399	464	507	452	408	470	434	462	415	458	524	447
19	303	331	327	373	313	346	393	361	394	400	364	417	431	413	381
20	234	323	278	317	353	354	365	396	425	353	362	330	364	357	351
21	231	298	324	283	282	314	358	386	412	363	315	313	359	380	352
22	249	257	288	301	289	279	292	361	416	397	308	320	319	334	368
23	296	279	278	245	250	290	278	279	312	319	334	289	301	311	325
24	263	317	262	243	230	281	258	251	280	288	322	306	335	287	335

Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware State Police, Dover DE.

The results for female GDL drivers were similar to those for males in that there was a 34.6% reduction in crashes after the statute was implemented. The percentage decline was 5.5% less than was observed for males. In general, females were involved in fewer crashes than males, and that was not a surprise. Like males, females are most likely to be involved in a crash at age 17 or 18. Similar to males, the number of crashes falls as the female ages.

Table 3.10
Crash Rate
by Age of Female Driver and Year
(per 1000 drivers)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	131.4	139.3	144.1	149.3	146.2	134.6	87.5	94.2	92.2	78.8	77.8	74.9	65.9	57.4	54.3
17	102.0	111.8	120.9	125.2	146.8	124.8	113.9	135.1	137.9	126.5	112.2	107.1	122.9	116.7	104.7
18	83.4	90.7	106.9	101.7	113.7	123.6	109.5	100.7	117.7	103.7	109.2	96.6	103.8	111.3	101.6
19	79.1	84.0	80.7	91.6	71.7	81.0	89.9	82.4	89.2	91.8	80.4	90.1	93.1	85.8	79.6
20	59.0	83.6	69.6	75.3	82.5	81.2	80.7	85.8	92.3	75.3	78.6	68.7	74.8	71.7	69.0
21	59.2	78.4	80.4	71.2	66.7	73.3	80.8	83.7	87.8	77.3	65.9	66.3	72.5	76.4	66.3
22	57.5	61.0	68.6	70.2	70.3	63.8	65.9	78.6	86.7	80.8	62.9	63.7	64.8	63.9	70.9
23	58.7	56.8	63.5	56.2	57.5	67.4	61.4	60.0	64.7	62.9	64.9	55.6	57.7	59.4	60.6
24	49.5	61.3	55.5	53.4	51.3	62.3	57.6	52.9	57.4	56.8	60.3	56.8	61.9	52.8	60.6

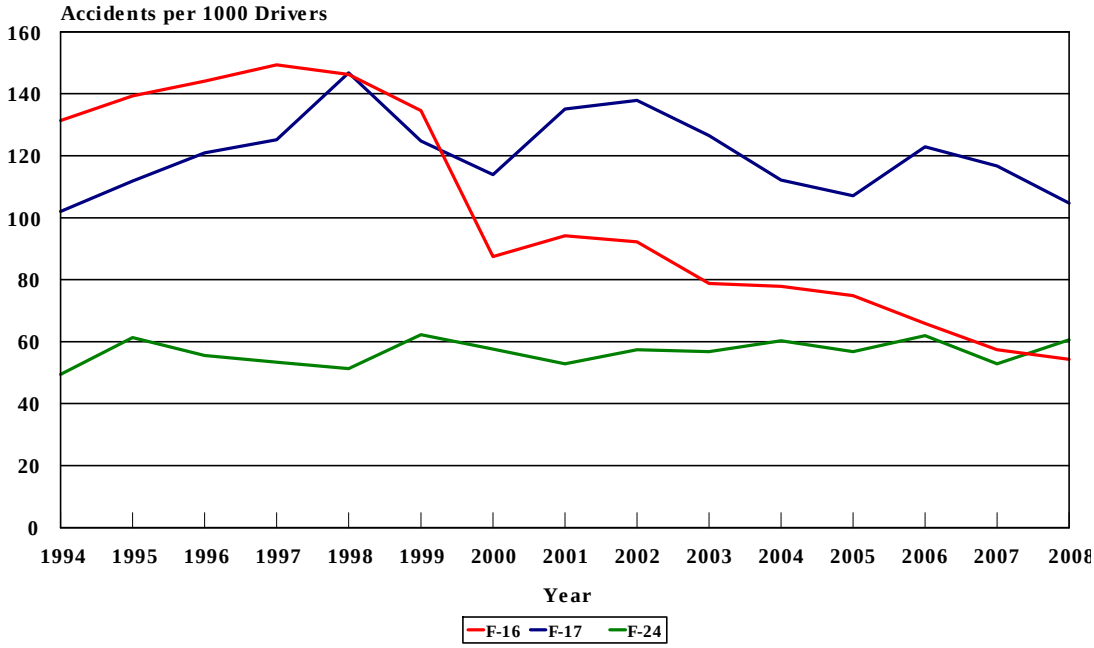
Source: Center for Applied Demography & Survey Research, University of Delaware

Table 3.10 contains the female driver crash rates and shows a 35% reduction in that rate between 1999 and 2000. As we have seen for males, the crash rates for 16 year-old drivers before GDL exceeded those of the 17 year-old drivers. Thus, females are seeing their rates fall because they are less exposed under GDL but receive sufficient experience to match their predecessors with one year of experience. The crash rates for female GDL drivers have been falling over the last eight years but not as rapidly as for males. Unlike males, there is not much improvement from age 20 to 24.

Using the data contained in Table 3.10 and graphed in Figure 3.4, both the program effect and the general downward trend are present. The two effects were isolated using ordinary least squares (OLS) regression. This analysis sets the GDL effect for men to be -37.952 and the annual decline as -3.597 for the 16 year-old drivers (adj. R^2=.857, F=28.880, Sig.=.000). This also allows the computation of an adjusted percentage change between 1999 and 2000 of 28.8% compared to the nominal 35% computed earlier. The difference is the long term downward trend has been removed leaving only the GDL statute effect.

The 17 year-old driver's performance produced an annual increase of -0.384 and a GDL effect of 0.629, neither of which was statistically significant.

Figure 3.4
Crash Rates
by Age of Female Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

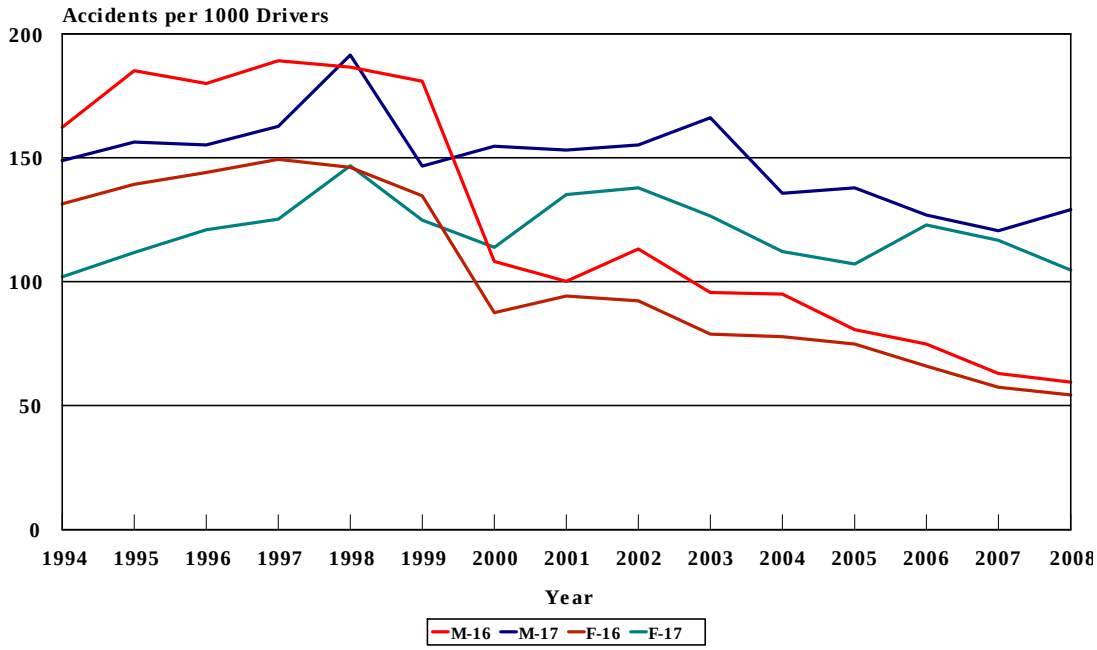
Table 3.11
Ratio of Male Crash Rate to Female Crash Rate
by Age of Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	1.23	1.33	1.25	1.27	1.28	1.34	1.24	1.06	1.23	1.21	1.22	1.08	1.13	1.10	1.10
17	1.46	1.40	1.28	1.30	1.30	1.17	1.36	1.13	1.13	1.31	1.21	1.29	1.03	1.03	1.23
18	1.54	1.55	1.41	1.49	1.39	1.31	1.48	1.53	1.24	1.36	1.28	1.30	1.26	1.12	1.30
19	1.33	1.31	1.61	1.34	1.63	1.36	1.45	1.45	1.42	1.29	1.35	1.10	1.02	1.29	1.29
20	1.48	1.24	1.51	1.31	1.14	1.16	1.29	1.17	0.96	1.33	1.12	1.35	1.23	1.23	1.27
21	1.61	1.36	1.30	1.32	1.33	1.37	1.15	1.09	1.15	1.17	1.41	1.28	1.11	1.08	1.07
22	1.53	1.42	1.31	1.15	1.21	1.49	1.36	1.07	0.93	1.07	1.36	1.24	1.20	1.25	1.04
23	1.48	1.38	1.24	1.42	1.36	1.23	1.32	1.21	1.16	1.15	1.21	1.15	1.41	1.28	0.98
24	1.42	1.28	1.48	1.41	1.28	1.19	1.25	1.15	1.29	1.19	1.14	1.14	1.07	1.38	1.07

Source: Center for Applied Demography & Survey Research, University of Delaware

Crash rates for males and females are compared in Table 3.11, and it appears that the GDL program has narrowed the difference between these two classes of drivers. Prior to GDL, the crash rates for males were generally 28% higher than those for female 16 year-old drivers. That difference was reduced to 15% after the implementation of GDL. As these drivers age the differences tend to narrow especially from ages 21 to 24 where it averages just 4%.

Figure 3.5
Crash Rates
by Age-Gender of Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

A graphical comparison of the male/female results are found in Figure 3.3. The by now familiar patterns are represented in the figure. The 16 year-old drivers of both genders had generally higher crash rates than those that were 17 before GDL. The GDL effect noted between 1999 and 2000 has the same general shape, but the decline for males is steeper and longer. The GDL drivers have far less difference between genders from 2000 on and the crash rate declines for both. Females of age 17 have essentially the same crash rate in 2008 as they had in 1994, while males have reduced their rate by a third.

The final tables for this section address the late night driving periods. For the first six months, the GDL drivers, who must always be supervised, are permitted to drive at any time. After the first six months and with the certification of certain facts by a parent or guardian, the GDL driver can drive unsupervised between 6am and 10pm. Supervision is required between 10pm and 6am as was the case in the first six months. There are exceptions for trips to church, work, and school. In other words, these late hours are heavily restricted and will drastically reduce the exposure of the GDL driver.

Table 3.12
Crashes from 10pm to 6am
by Age of Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	95	93	113	111	112	110	54	40	40	29	38	40	28	35	33
17	101	108	133	147	128	137	107	108	119	128	108	89	98	109	73
18	109	138	153	157	150	177	162	188	167	143	146	132	124	161	129
19	109	133	137	158	113	146	173	162	152	149	144	126	129	126	119
20	93	109	104	109	106	125	141	128	145	157	125	107	124	134	126
21	88	110	119	121	108	117	152	159	146	152	126	124	122	123	137
22	107	104	92	109	91	91	112	134	137	159	109	91	124	127	121
23	115	93	116	110	96	88	102	97	106	119	120	99	126	123	104
24	78	113	96	87	78	96	79	84	95	79	113	97	99	103	110

Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware State Police, Dover DE.

An inspection of Table 3.12 finds some variation from the themes developed in other tables. The usual pattern of higher numbers of crashes among 16 year-old drivers in the pre-GDL years is not as apparent. The steady decline in crashes from 1994 through 2008 is not as pronounced and the decline from young to old in any given year is not as recognizable. The characteristic reduction from 1999 to 2000 is apparent and is larger than for crashes in general. Keeping people with minimal driving experience off the road in times when they are tired and not alert is a good thing.

Table 3.13
Crash Rate from 10pm to 6am
by Age of Driver and Year
(per 1000 drivers)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	17.3	16.5	19.2	18.6	18.5	18.0	8.8	6.6	6.6	4.7	6.1	6.3	4.3	5.1	5.0
17	14.5	15.1	17.9	19.1	17.5	18.0	14.4	14.8	16.0	17.3	14.2	11.2	12.5	12.7	9.4
18	15.0	18.5	19.7	19.8	18.4	21.7	19.7	23.4	20.8	17.3	17.8	15.7	14.1	17.5	14.7
19	14.0	16.7	16.7	19.2	12.9	16.8	19.6	18.2	17.1	16.7	15.9	13.8	14.0	12.7	12.5
20	11.5	13.8	12.8	12.8	12.4	14.0	15.4	13.8	15.4	16.6	13.2	11.0	12.8	13.5	12.2
21	11.2	14.4	14.8	15.2	12.8	13.8	17.0	17.3	15.6	16.0	13.3	12.9	12.2	12.3	12.7
22	12.3	12.2	11.0	12.8	11.1	10.5	12.8	14.6	14.4	16.3	11.1	9.1	12.4	12.2	11.6
23	11.5	9.5	13.3	12.7	11.0	10.3	11.4	10.7	11.0	11.7	11.9	9.5	12.2	11.8	9.6
24	7.3	10.8	10.1	9.5	8.7	10.7	9.0	9.0	9.9	7.8	10.8	9.1	9.2	9.4	9.9

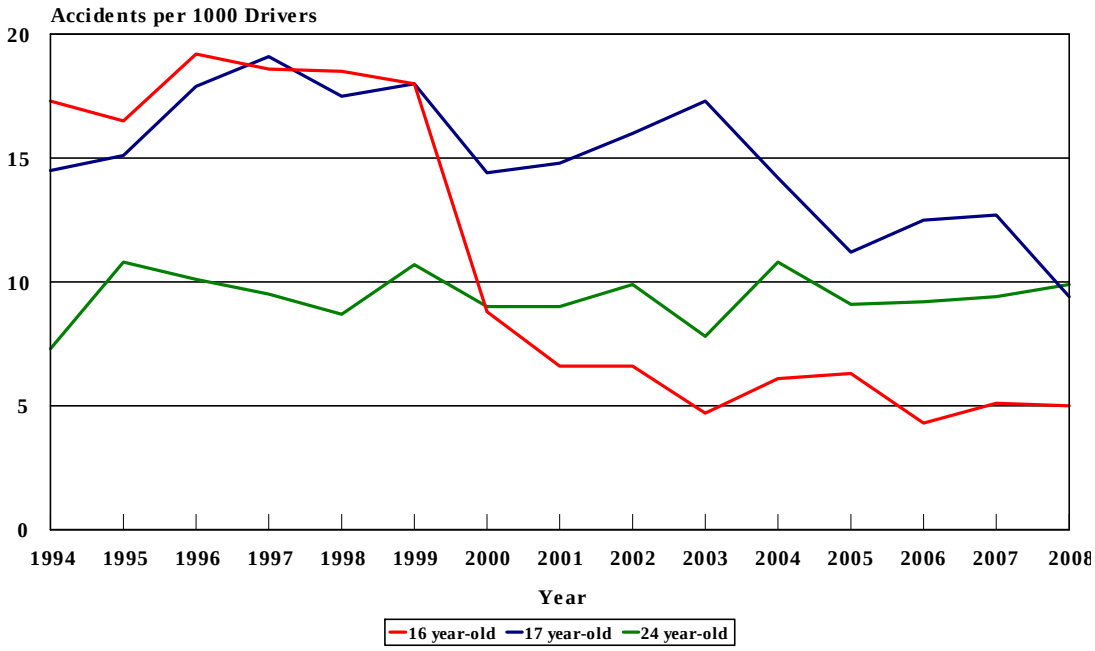
Source: Center for Applied Demography & Survey Research, University of Delaware
Delaware State Police, Dover DE.

Table 3.13 contains the late night crash rates and shows a 51.1% reduction in that rate between 1999 and 2000. The crash rates for 16 year-old drivers before GDL generally have exceeded those of the 17 year-old drivers in earlier tables. In Figure 3.6, the rates for the two

groups are much closer together until GDL is introduced in 2000. The crash rates for late night GDL drivers have been falling over the last eight years, but not as uniformly as other categories. Within any given year, there is not as much improvement from age 20 to 24 compared to earlier tables.

Using the data contained in Table 3.13 and graphed in Figure 3.6, both the program effect and the general downward trend are present. The two effects were isolated using ordinary least squares (OLS) regression. This analysis sets the GDL effect for men to be -10.306 and the annual decline as -0.235 for the 16 year-old drivers (adj. R^2=.892, F=48.740, Sig.=.000). This also allows the computation of an adjusted percentage change between 1999 and 2000 of 59.18% compared to the nominal 51.1% computed earlier. The difference is the long term downward trend has been removed leaving only the GDL statute effect.

Figure 3.6
Late Night Crash Rates
by Age of Driver and Year



The 17 year-old driver's performance produced an annual increase of -0.341 and a GDL effect of -0.846, neither of which was statistically significant.

Several useful patterns emerged from the crash data. First, the statute has had its intended effects. The 16 year-old drivers were constrained by limiting exposure on the roads and by

increasing supervision. The result was a significant reduction in crashes of about 30% or greater. This benefitted the GDL driver as well as other drivers and passengers who may have been injured in the crash. The reduction in property damage to the vehicles involved is an important benefit as well. Both male and female GDL drivers realized these benefits although a male's benefits were somewhat larger. By 2008, the gap in crash rates between males and females had closed substantially.

The primary reason for the reductions in crash rates almost surely is related to the reduction in exposure (not measured here) dictated by the statute. As soon as the GDL drivers turned 17 and were able to once again increase their exposure, the crash rates climbed back to the usual levels for a 17 year-old driver. There is a slight downward trend in crash rates for 17 year-old drivers which might be attributable to the program, or it may simply be an increase in the number of GDL drivers who are 17, which can happen in a number of ways.

The data clearly shows that crash rates reach their peak with 17 year-old drivers, remain high with only a slight reduction among 18 year-old drivers. From that point on, the rates drift lower. A case could be made to continue the GDL program for a longer period by extending the second six month conditions of the current statute for an additional six or twelve months. This would certainly reduce exposure in the late night hours where the largest reduction in crashes attributable to the program was observed. The constraints on passengers would also serve to reduce distractions, although this cannot be shown from this data.

In the next section, the impact of GDL drivers on traffic violations will be examined using the same structure adopted here.

Traffic Violations

Traffic violations are another indicator of both exposure and supervision. Driving behavior as measured by the number and rate of traffic violations adds another dimension to the evaluation. It is important to remember that there are a wide variety of traffic violations that range from very minor to extremely serious issued by a variety of police departments. There is no attempt here to weight the numbers. On the other hand, crashes will also vary from trivial to catastrophic. They are both volume measures and it is assumed that the distribution of seriousness will be similar between age groups.

Table 4.1
Total Violations
by Age of Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	2380	2498	2649	2956	3083	3544	2467	2394	2297	2245	2241	2237	2036	1919	1601
17	3287	3668	4060	4573	4909	5668	5573	5389	5108	5049	5170	5290	5414	5570	5274
18	4180	4546	5031	5577	6227	7470	7303	7295	6846	6923	7012	7101	7699	8895	8258
19	4393	4487	4543	5397	5908	7280	7327	7446	7015	7614	7702	7790	7846	8999	9348
20	4017	4377	4338	4713	5235	6554	7152	7189	6770	7045	7359	7673	8351	8908	9323
21	3994	4119	4218	4656	4652	6239	6643	6732	6980	7087	7331	7575	8220	9513	9172
22	4151	4042	4004	4464	4383	5721	6159	6488	6223	6732	7126	7520	8102	9357	9456
23	4403	4344	3866	4140	4432	5102	5810	6232	6081	6571	6944	7317	7818	9471	9121
24	4273	4482	3968	4014	3938	5075	5071	5331	5301	5907	6547	7186	7769	8929	9185

Source: Center for Applied Demography & Survey Research, University of Delaware
DELJIS, Dover, DE

Table 4.1 contains the count of traffic violations by age group for the 15 year period covered by the evaluation. First of all, there is a 30.4% nominal decline in the number of violations between 1999 and 2000 for 16 year-old drivers. However, the 2,467 violations in 2000 are not substantially different that the numbers observed in 1994 and 1995. Second, there is a decline in violations beginning in 2006 after a stable period. Third, any reduction in the GDL driver's violations is overwhelmed by the violations one year later. Finally, it is noteworthy that there is very little decline in violations for the older groups within a given year. In other words, traffic violations are not as related to age in contrast to the accident data where the trend was substantial.

The violation rate is simply the number of violations divided by the number of Delaware drivers in the age group. For convenience, that calculation is multiplied by 1000 and the rates in Table 4.1 are violations per 1000 drivers.

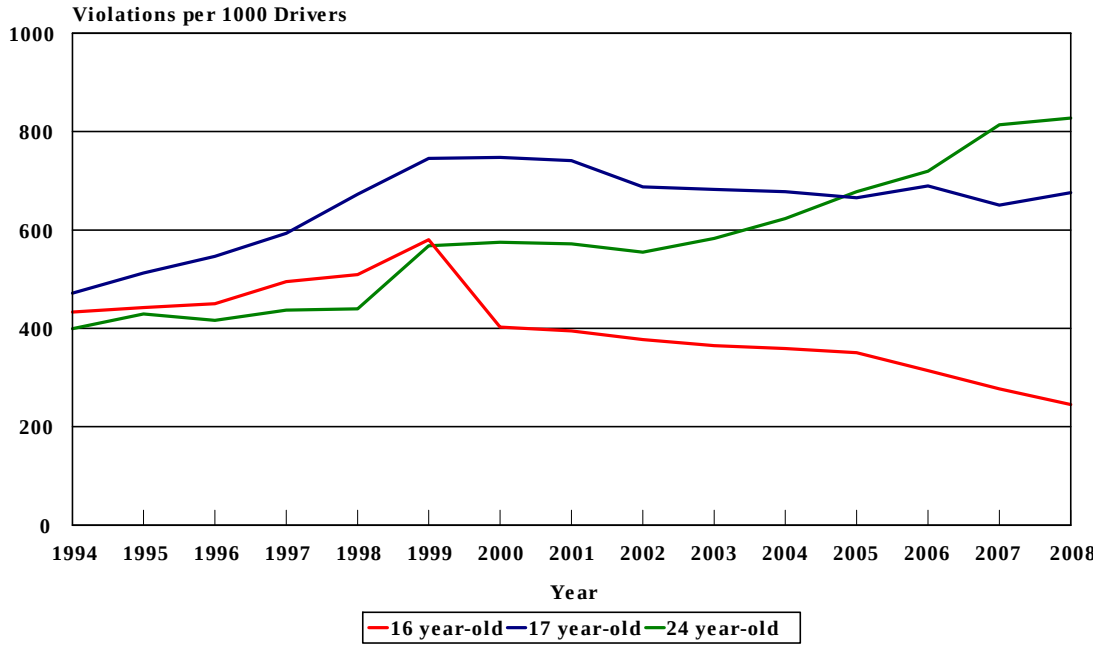
Table 4.2
Violation Rate
by Age of Driver and Year
(per 1000 drivers)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	433.0	442.4	449.8	494.8	509.3	580.1	402.3	394.8	377.3	365.0	359.2	350.6	313.9	277.3	244.8
17	471.8	512.5	546.1	593.4	672.3	745.7	747.5	740.9	687.4	682.1	677.9	665.4	689.5	650.5	675.7
18	576.6	610.5	646.7	702.1	762.7	917.7	886.8	907.0	854.5	839.9	854.8	846.8	874.9	967.2	938.1
19	566.1	562.9	555.2	655.0	677.1	839.7	832.0	835.2	790.2	853.5	848.6	853.0	849.1	910.4	984.2
20	496.8	555.5	533.3	555.1	611.4	736.1	782.8	773.2	718.8	746.8	777.4	789.8	858.7	900.1	900.4
21	508.3	537.8	522.9	584.3	550.5	734.7	742.2	732.1	745.3	747.1	772.2	786.4	824.5	949.8	849.6
22	475.9	475.4	477.9	523.0	532.8	661.2	706.1	706.1	652.0	690.9	726.5	754.3	811.4	902.0	907.7
23	438.5	443.9	442.3	477.0	510.0	599.7	650.9	686.2	632.9	648.7	690.1	703.8	754.1	907.1	841.3
24	399.2	429.6	416.4	437.3	439.4	567.9	575.3	571.8	554.9	582.8	623.2	677.7	719.5	813.9	827.4

Source: Center for Applied Demography & Survey Research, University of Delaware
DELJIS, Dover, DE

The difference between 1999 and 2000 is a decline 30.7% including the trend effect and the GDL effect. There is a shallow decline in the violation rate from 2000 through 2005 and then a more significant decline though the remainder of the period. The 17 year-old drivers' violation rates increased significantly from 1994 through 2001 before beginning a shallow decline.

Figure 4.1
Violation Rates
by Age of Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

A close examination of the violation rates for the two youngest groups gives a better picture of exposure than the accident rate. As exposure increases significantly moving from age 16 to age 17, the violation rate nearly doubles. From age 17 to age 18, the violation rate increases another 25%. For ages 19 to 23, the rates are consistent with those observed for age 18. The rates are generally the lowest at age 24. These different patterns are shown for three age groups in Figure 4.1, above.

Using the data contained in Table 4.2 and partially graphed in Figure 4.1, both the program effect and the general downward trend are present but muted. The two effects were isolated using ordinary least squares (OLS) regression. This analysis sets the GDL effect for men to be -80.832 and the annual decline as -8.169 for the 16 year-old drivers (adj. R^2=.650, F=14.028, Sig.=.001). This also allows the computation of an adjusted percentage change between 1999 and 2000 of 17.4% compared to the nominal 30.7% computed earlier. The difference is the long term downward trend has been removed leaving only the GDL statute effect.

Table 4.3
Violation Rate
by Cohort and Year
(per 1000 drivers)

	1997	1998	1999	Average 1997-99		2000	2001	2002	Average 2000-02		Net
16	494.8	509.3	580.1	528.1		402.3	394.8	377.3	391.5		-136.6
17	672.3	745.7	747.5	721.8		740.9	687.4	682.1	703.5		-18.4
18	917.7	886.8	907.0	903.8		854.5	839.9	854.8	849.7		-54.1
19	832.0	835.2	790.2	819.1		853.5	848.6	853.0	851.7		32.6
20	773.2	718.8	746.8	746.3		777.4	789.8	858.7	808.6		62.4
21	745.3	747.1	772.2	754.9		786.4	824.5	949.8	853.6		98.7
22	690.9	726.5	754.3	723.9		811.4	902.0	907.7	873.7		149.8

Source: Center for Applied Demography & Survey Research, University of Delaware

In Table 4.3 below, the three years before the implementation of GDL are compared to the three years after implementation. In the 1997 column are displayed the traffic violation rates for those who were 16 years old in 1997, and as they age through the next six years. While the people in the cohort will change somewhat as time passes, it should be a good indicator of what would have happened had the cohort remained intact. The average results for the first three cohorts are shown in the fourth column. The three cohorts following GDL implementation are treated similarly, yielding another three year average. The column labeled "Net" shows a large

difference for 16 year-old drivers of -136.6 (25.8%) for the post GDL period. The impact on the GDL drivers when they become 17 is much less -18.4. By the time these cohorts age by three years, they show increases in violation rates. Thus, the pattern for the cohorts is quite consistent with the results in Table 4.2. As exposure increases, violation rates increase. When exposure rates begin to level out, the traffic violation rates do as well.

The analysis of crash rates identified different patters by gender. The violation data may have similar or different relationships by gender. That data will be examined next starting with a look at the violations of male drivers, age 16 to 24.

Table 4.4
Violations
by Age of Male Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	1570	1655	1694	1804	1928	2244	1637	1526	1479	1411	1429	1446	1251	1187	1006
17	2248	2479	2758	3080	3128	3666	3685	3423	3231	3105	3271	3436	3509	3487	3319
18	2968	3246	3556	3837	4161	4904	4905	4853	4588	4597	4647	4696	5133	5908	5474
19	3148	3120	3069	3626	4042	4872	4896	5120	4679	5129	5125	5120	5068	5960	6276
20	2922	3108	2994	3134	3462	4440	4654	4645	4409	4727	4902	5077	5426	5758	6111
21	2851	2839	2852	3125	3095	4110	4416	4411	4467	4682	4841	4999	5402	6161	5819
22	2883	2823	2629	3019	2887	3737	3990	4211	4104	4330	4678	5025	5273	6086	6005
23	3010	2988	2638	2670	2909	3217	3757	4089	3903	4186	4489	4792	5274	6345	5951
24	2958	3060	2701	2704	2640	3321	3202	3471	3486	3869	4174	4478	4977	5810	5952

Source: Center for Applied Demography & Survey Research, University of Delaware
DELJIS, Dover, DE

The data for males contains much the same patterns as those observed earlier for all drivers, Table 4.4. There is a reduction in violations between 1999 and 2000 of 27% for drivers of age 16. However, since the number of violations was rising during the period 1994 to 1999 and the decline in 2000 was at a level similar to those measured during 1995 and 1996, it may be difficult to assign this decline to the GDL. From 2000 to 2005, the number of violations attributed to GDL drivers declined slowly. In the last three years, the rate of decline accelerated.

Looking at the data for single years across age groups, the pattern previously identified for all drivers is repeated. The 16 year-old males have the lowest number of violations without exception. The 17 year-old drivers on average attract double the number of violations when compared to those who were 16. In 2008, the number triples. The 18 year-old drivers exceed the violations of the drivers of age 17 but only by a third to half. In other words the rate of growth of violations is slowing. Somewhere between 18 and 19 years of age, the number of violations peaks

and begins a slow decline. This entire pattern suggests that violations are a function primarily of exposure on the roadway. That exposure grows for males from age 16 to 19 and parallels the relationship observed earlier for the all drivers.

Table 4.5
Violation Rate
by Age of Male Driver and Year
(per 1000 drivers)

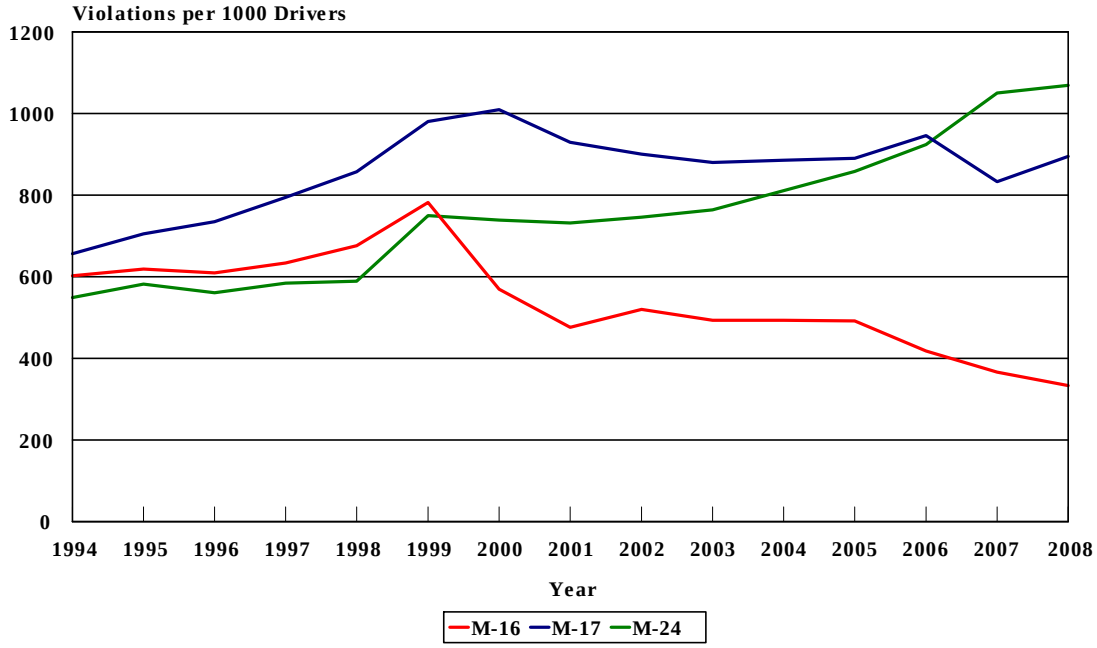
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	602	619	609	634	676	782	569	476	520	493	493	492	418	366	333
17	656	705	735	794	857	980	1009	929	900	880	885	890	946	833	895
18	802	855	917	954	1019	1215	1194	1198	1142	1133	1140	1148	1170	1316	1244
19	801	774	743	870	926	1108	1104	1169	1049	1124	1131	1137	1099	1176	1332
20	709	774	723	732	809	977	1008	1006	916	997	1015	1034	1117	1171	1161
21	721	736	706	782	733	977	977	957	956	977	998	1018	1077	1222	1060
22	656	659	629	711	702	873	931	917	865	896	956	1016	1042	1183	1148
23	602	613	604	618	670	764	854	880	815	828	875	922	1025	1219	1086
24	549	582	561	584	589	750	739	732	746	764	811	858	924	1050	1069

Source: Center for Applied Demography & Survey Research, University of Delaware

In Table 4.5, the reduction in violations from 1999 to 2000 for the male GDL driver is replicated by the violation rate which fell by 27.2%. The violation rates for those 16 year-old drivers also fell substantially from 2000 to 2008 predominantly in the last 3 years. Violation rates generally peak when drivers reach the age between 18 and 19 years. For the older groups the violation rates simply drift lower.

When these data are displayed graphically in 4.6, the difference in violation rate trends over time is also interesting. All three series are rising through the first half of the time series. The 16 year-old trends turn down after the GDL statute was passed and continue to fall throughout the remainder of the period. The line representing age 17 drivers stopped rising, then fell slightly, and then remained relatively stable for the balance of the years. The line representing the 24 year-old drivers diverged significantly after 1999. After briefly stabilizing, the violation rate grew rapidly only slowing in 2008. During the entire period, the violation rate almost doubled for the oldest group although it still is lower than the preceding age groups in 2008.

Figure 4.2
Violation Rates
by Age of Male Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

Using the data contained in Table 4.5 and graphed in Figure 4.2, it is clear that both the program effect and the general downward trend are present. The two effects were isolated using ordinary least squares (OLS) regression. This analysis sets the GDL effect for men to be -101.348 and the annual decline as -12.013 for the 16 year-old drivers (R^2=.665, F=14.893, Sig.=.001). Neither coefficient was statistically significant, largely because the 1999-2000 shift only returned to levels observed prior to 1997.

However, these estimates allow the computation of an adjusted percentage change between 1999 and 2000 of 16.25% compared to the nominal 27.2% computed earlier. The difference between the two calculations is that the long term downward trend has been removed leaving only the GDL statute effect.

The 17 year-old driver's performance produced an annual increase of 5.490 and a GDL effect of 78.434, neither of which was statistically significant.

Table 4.6
Violations
by Age of Female Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	809	843	955	1152	1155	1300	830	867	818	834	813	791	785	730	595
17	1038	1189	1302	1493	1781	1998	1888	1966	1877	1944	1898	1852	1904	2083	1955
18	1212	1300	1475	1740	2066	2566	2398	2441	2258	2326	2365	2404	2566	2984	2784
19	1245	1367	1474	1771	1866	2408	2430	2326	2335	2485	2577	2669	2771	3037	3072
20	1095	1269	1344	1579	1773	2114	2498	2544	2361	2318	2457	2596	2925	3150	3212
21	1143	1280	1365	1531	1556	2129	2227	2321	2513	2405	2491	2576	2817	3352	3352
22	1268	1219	1375	1445	1496	1984	2169	2276	2119	2402	2449	2495	2829	3266	3450
23	1393	1356	1228	1470	1523	1885	2052	2143	2178	2385	2455	2524	2541	3124	3167
24	1315	1422	1266	1310	1298	1754	1869	1860	1814	2036	2372	2707	2786	3117	3233

Source: Center for Applied Demography & Survey Research, University of Delaware

The violation data for females is provided in Table 4.6. These data are similar to those for males but with some notable differences. First, the rates for 16 year-old female drivers are rising from 1994 to 1999. In 2000 as GDL is implemented the number of violations falls from 1300 to 830, a nominal decline of 36.2%. From 2000 to 2008 the number of violations declines by 28.3% in contrast to the steeper decline of 41.5% for males.

The patterns for 17 year-old female drivers are similar in that the violations almost doubled from 1994 to 1999 and were basically flat over the rest of the period 2000-2008. As usual, the year 2000 16 year-old female group (GDL) had similar violation levels as those who did not go through the GDL process.

Males generally peaked in violation levels between age 18 and 19. Female violations continue to rise after age 19 for a year or two before stabilizing or declining slightly. Over the entire period 1994-2008, female violations more than double and thus are increasing faster than those for male drivers.

It is important to note that females follow the same pattern for the early years 16-19 as did males. Since it is reasonable to assume that violations are highly correlated to exposure on the highways, the increases in violations being observed in the early years 16-19 are reflecting the fact that these young drivers are simply driving more.

Table 4.7
Violation Rate
by Age of Female Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	280	284	307	368	361	401	255	270	252	254	242	230	225	198	169
17	293	327	354	390	488	517	496	534	489	502	477	453	460	476	477
18	341	356	378	444	506	625	581	603	565	556	558	560	581	634	633
19	325	347	364	435	428	563	556	531	529	570	573	576	598	631	642
20	276	329	336	375	414	485	553	551	513	494	517	540	601	633	631
21	293	337	339	385	368	497	503	503	535	512	529	546	569	674	632
22	293	289	327	337	364	454	489	496	441	489	493	497	574	625	665
23	276	276	281	337	351	438	453	461	452	470	478	485	487	597	591
24	248	275	268	288	290	389	417	392	372	402	452	503	515	574	585

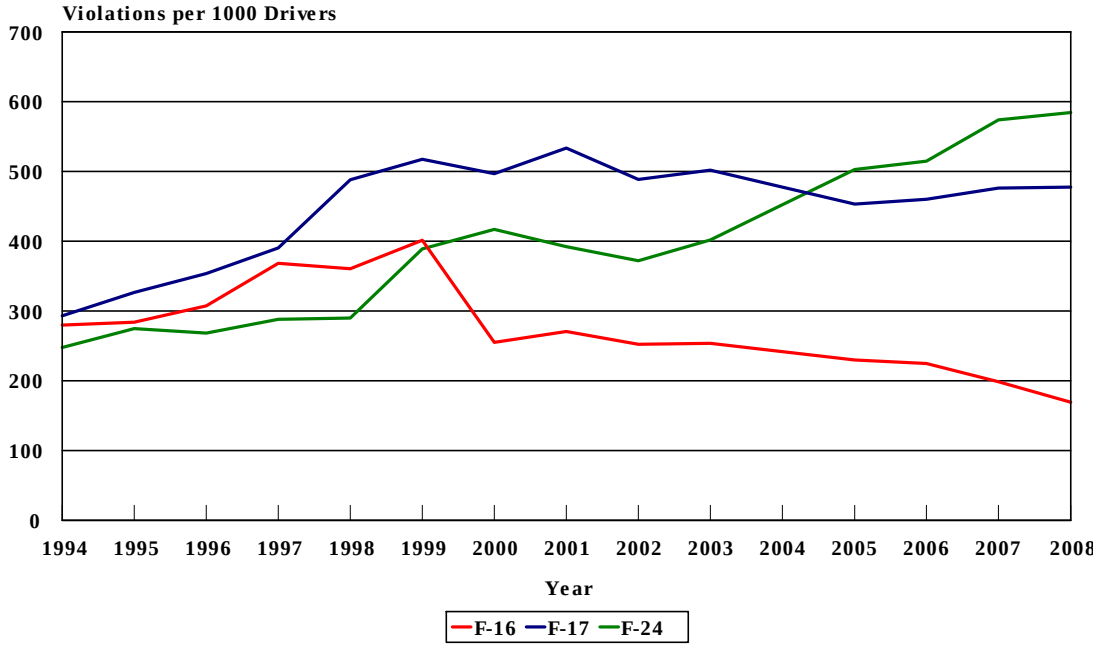
Source: Center for Applied Demography & Survey Research, University of Delaware
DELJIS, Dover, DE

Female violation rates are found in Table 4.7 and are graphed in Figure 4.3 for drivers of ages 16, 17, and 24. The first point is that the violation rate for females fell 36.4% nominally, as expected between 1999 and 2000. If you examine Figure 4.3, the graph shows a fairly steady increase in the rate prior to the implementation of GDL in 2000. After the start of the GDL program there is a sharp drop in the violation rate to a level slightly below those observed in 1994 and 1995. From 2000 to 2008, there is a gradual but steady decline in the rate.

Looking at the 16 year-old rate in 2000 and comparing it to the 17 year-old rate in 2001 (255 vs. 534), those in the program are at similar levels as other 17 year-old drivers prior to the introduction of GDL. The same result occurs if you examine each pair i.e. violation rate for 16 year-olds in year one and 17 year-olds in year two. This doesn't mean that the program effects have largely vanished. More likely the reason is associated with increases in exposure.

The violation rates for females tend to moderate with age with the peak years between ages 18 and 20. The general trend for the 18 to 24 age groups is an increase of more than 100% over the time period 1994-2008. This rapid rise is illustrated in Figure 4.3 by the line for 24 year-old females. Its trajectory is decidedly different than that represented by the other two ages, 16 and 17. The reason for this apparent trend is no readily ascertainable from this data. Certainly increases in police presence, changes in statutes, changes in enforcement procedures, and more aggressive driving by people are candidates. In any case, while this is an interesting question it does not impact on the evaluation of GDL.

Figure 4.3
Violation Rates
by Age of Female Driver and Year



Source: Center for Applied Demography & Survey Research, University of Delaware

Using the data contained in Table 4.7 and graphed in Figure 4.3, it is clear that both the program effect and the general downward trend are present. The two effects were isolated using ordinary least squares (OLS) regression. This analysis sets the GDL effect for females to be -82.544 and the annual decline as -2.419 for the 16 year-old drivers (R^2=.587, F=10.952, Sig.=.002). Neither coefficient was statistically significant, largely because the 1999-2000 shift only returned to levels only slightly below those observed prior to 1997.

However, these estimates allow the computation of an adjusted percentage change between 1999 and 2000 of 16.25% compared to the nominal 36.4% computed earlier. The difference is the long term downward trend has been removed leaving only the GDL statute effect.

The final table in this section is Table 4.8 below, and it contains the ratio of male violation rates to female violation rates. This ratio is a way of representing that relationship over time and age group.

Table 4.8
Ratio of Male Violation Rate to Female Violation Rate
by Age of Driver and Year

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
16	2.15	2.18	1.98	1.72	1.87	1.95	2.23	1.76	2.06	1.94	2.04	2.14	1.86	1.85	1.97
17	2.24	2.16	2.08	2.03	1.76	1.90	2.03	1.74	1.84	1.75	1.86	1.96	2.06	1.75	1.87
18	2.35	2.40	2.42	2.15	2.01	1.94	2.05	1.99	2.02	2.04	2.05	2.05	2.01	2.07	1.97
19	2.47	2.23	2.04	2.00	2.17	1.97	1.99	2.20	1.98	1.97	1.97	1.97	1.84	1.86	2.07
20	2.57	2.36	2.15	1.95	1.95	2.01	1.83	1.83	1.79	2.02	1.96	1.91	1.86	1.85	1.84
21	2.46	2.19	2.08	2.03	1.99	1.97	1.94	1.90	1.79	1.91	1.89	1.87	1.89	1.81	1.68
22	2.24	2.28	1.92	2.11	1.93	1.92	1.90	1.85	1.96	1.83	1.94	2.05	1.81	1.89	1.73
23	2.18	2.22	2.15	1.83	1.91	1.74	1.89	1.91	1.80	1.76	1.83	1.90	2.11	2.04	1.84
24	2.22	2.12	2.09	2.03	2.03	1.93	1.77	1.87	2.01	1.90	1.80	1.71	1.80	1.83	1.83

Source: Center for Applied Demography & Survey Research, University of Delaware

The most notable point about this table is that the typical male driver is almost twice as likely to be cited for a violation as a female. The 16 and 17 year-old drivers are very much the same as the older groups with respect to this ratio. As the data moves from left to right, the ratio becomes smaller. This reflects a point made earlier that violation rates were declining more rapidly for males than females hence reducing the ratio. The ratio changes modestly if at all as the table is traversed within a single year.

The report concludes with a brief summary of the main findings in the final section.

Observations

This evaluation was intended to determine if the Graduated Drivers License statute worked as designed not only when it was implemented but also eight years later. Based on the data gathered, the answer is yes. In the first year of the statute, 282 crashes did not happen and 72 of those would have involved personal injury. The GDL statute reduced the exposure of 16 year-old drivers in several ways and thus reduced their crash rate in overall crashes, personal injury crashes, and late night crashes by the amounts listed below:

- Crash rates for drivers decreased by 30.8%;
- Crash rates involving personal injury decreased by 30.1%;
- Crash rates during the period 10pm-6am decreased by 59.1%;
- Crash rates involving male drivers decreased by 35.1%;
- Crash rates involving female drivers decreased by 28.8%.

The second finding is that the 16 year-old drivers do not perform any better at age 17 with respect to crashes than 17 year-old drivers from years preceding the implementation of the statute. If further reduction in the 17 year-old drivers crash rates is desirable, this might be achieved by extending the current law to include restrictions on unsupervised driving from 6 months to 12 or 18 months, based on the experience of those of age 16.

The third finding is that crash rates fall sharply as the driver ages from 16 to 24. The peak age for crashes is currently between 17 and 18 years old. Those rates are nearly double what they are at age 24.

The fourth finding is that personal injury crashes are roughly 25% of all crashes independent of the age of the driver. As with all crashes, personal injury crashes peak with drivers of age 17 and 18. The rates for the 17-18 age groups are also nearly double what is observed for age 24.

The fifth finding is that late night crashes were the most affected by the GDL statute. The steep reduction in crashes is largely attributed to the constraints placed on GDL drivers from 10 pm to 6am. Those constraints sharply limited their exposure on the roadways.

The violation data produced similar but not as powerful results as the crash data for evaluating the GDL statute. It proves to be an excellent method for measuring exposure to the state's roadways and perhaps allows the separation of experience from driver behavior.

- Violation rates for drivers of age 16 decreased by 17.4%;
- Violations involving male drivers decreased by 20.6%;
- Violations involving female drivers decreased by 25.2%.

The statistics cited here show the reductions in violations attributable to the GDL program were somewhat less than those for crashes. The really sharp downward trend in crashes across the age groups is not found in the violation data. Violations trend downward but very slowly.

APPENDIX A

Delaware's Graduated License Statute

CHAPTER 27. DRIVER'S LICENSE

§ 2710. Issuance of a Level 1 Learner's Permit and Class D operator's license to persons under 18 years of age.

(a) The Division, upon receiving from any person over the age of 16 years, an application for a Level 1 Learner's Permit, together with the fee required by law, may, in its discretion, issue such a permit entitling the applicant, with such a permit in the applicant's immediate possession, to drive a motor vehicle upon the highways of this State provided they meet all requirements for the permit. Eye screening and medical examinations will be required in accordance with Division policies.

The Division may issue a distinctively designed Level 1 Learner's Permit document or issue the permit holder a Class D license encased in a packet which explains the driver's limited driving privileges. If the permit holder completes the 12-month driving experience and the sponsor does not withdraw their endorsement, the Division will notify the permit holder by mail that the permit holder is eligible for a Class D license. The time used to compute the 12 months of driving experience shall not include any period of time when the permit holder's driving privileges were suspended, revoked, canceled, denied or surrendered.

(b) Level 1 Learner's Permit. -- A person who is at least 16 years old but less than 18 years old may obtain a Level 1 Learners Permit if the person has:

(1) Successfully completed a course in driver education in a public or private high school in this State, which has been approved by the Department of Education and meets the standards for such courses described by that Department. If the applicant has completed a course of instruction in driver education in a public or private high school outside this State, the applicant must produce a certified copy of that applicant's high school transcript evidencing the completion of the driver education course;

(2) Passed a written test and road skills test administered by the Division or administered by a driver education teacher. Students who require specialized evaluation,

training or equipment to operate a motor vehicle because of a physical or mental disability will be identified by the driver education teacher and tested by the Division;

(3) Been certified by the driver education teacher as qualified for licensing; and

(4) Submitted an application signed by a sponsor as required by subsection (e) of this section.

(c) Restrictions pertaining to the Level 1 Learner's Permit. -- A learner's permit authorizes the permit holder to drive the specified type or class of motor vehicles as those defined under § 2702(d)(1) of this title for 12 months only under the conditions listed below. If the learner's permit expires, the applicant will pay the appropriate fees and pass a written and road skills examination conducted by the Division.

(1) The Level 1 Learners Permit must be in possession of the permit holder.

(2) When the permit holder is under mandatory supervision, the permit holder must be supervised by a properly licensed parent, guardian or a licensed driver at least 25 years of age who has held a Class D license for at least 5 years. The supervising driver must be seated beside the permit holder in the front seat of the vehicle when it is in motion. No person other than the supervising driver can be in the front seat.

(3) For the first 6 months after issuance, the permit holder may only drive supervised. In order for the permit holder to be able to drive unsupervised as called for in paragraph (c)(4) of this section, a parent or guardian shall certify that the permit holder has completed 50 hours of driving time, which shall include 10 hours of nighttime driving. This certification form shall be developed by the Division of Motor Vehicles, Department of Education and Department of Highway Safety and shall be signed by the parent or guardian and submitted to a Department of Education approved program at the end of this 6 month period.

(4) After the first 6 months from issuance, the permit holder may drive unsupervised between the hours of 6:00 a.m. and 10:00 p.m. Such a permit holder may drive only with

supervision from 10:00 p.m. to 6:00 a.m. with the exception of times when the permit holder is traveling to and from church activities, work activities and the permit holder's school. For purposes of this section, the term "school" shall not include school-related activities that do not take place on school property.

(5) No passengers other than the adult supervisor and 1 or fewer other passengers can be in the vehicle during the first 12 months. However, the passenger restrictions of this paragraph shall not apply to immediate members of the driver's family provided the adult supervisor is in the car. During the second 6 month period of unsupervised driving, when a supervisor is not present, only 1 other passenger in addition to the driver can be in the vehicle.

(6) The restrictions of paragraph (c)(4) of this section shall not apply to those individuals who are Delaware volunteer fire fighters and ambulance attendants as long as they have permission from their fire chief or ambulance captain in writing with the permit referenced in paragraph (c)(1) of this section and are returning home from their company stations or place of education or training relating to their respective duties for the sole purpose of either an emergency response, an official fire or ambulatory meeting, or education or training relating to said duties.

(7) The permit holder and all passengers, under the age of 18, in the vehicle must wear a seat belt or be secured in a child safety seat or booster seat as required by § 4802 or § 4803 of this title when the vehicle is in motion.

(8) The permit holder shall not operate a motor vehicle while using a cellular telephone, text messager, or substantially similar electronic device. This paragraph shall not apply if the permit holder has stopped the vehicle at a location off of the lanes of travel. Any permit holder found to be in violation of this paragraph is deemed to be operating the vehicle in a negligent manner and is subject to the penalties set forth in subsection (j) of this section.

(d) Class D license qualifications. -- A person who is at least 17 years old but less than 18 years old may obtain a Class D

operator's license if the person meets the following requirements:

(1) The person has held a Level 1 Learner's Permit issued by the Division for at least 12 months; and

(2) The person has an application signed by a sponsor as specified in subsection (e) of this section. The sponsor's signature on the Level 1 Learner's Permit application authorizes the minor to obtain the Class D operator's license when eligible unless the sponsor withdraws, in writing, their authorization for any such license or permit.

(e) The Division shall not grant the application of any minor between the ages of 16 years and 18 years for a operator's license or Level 1 Learner's Permit unless such application is signed both by the applicant and a sponsor who is the applicant's parent, guardian, Division of Family Services case worker or court-ordered custodian who resides in this State.

(1) Nevertheless, if the applicant has no parent, guardian, Division of Family Services case worker or court-ordered custodian residing in the State to act as the applicant's sponsor, another responsible adult person acceptable to the Secretary of Transportation who resides with the applicant in this State may sign the application.

(2) The following sponsors are listed in order of preference:

a. Father or mother of the minor if both parents are living together within this State and the minor resides with both parents.

b. Father of the minor, if the father is living within this State, and the minor resides with the father only; mother of the minor, if the mother is living within this State, and the minor resides with the mother only; or father or mother, if the father or mother live within this State, and the minor resides with neither parent, and the minor has no legal guardian within this State;

c. Guardian, Division of Family Services case worker or court-ordered custodian of the minor, duly appointed, as such, under the laws of this State; or

d. Any suitable person acceptable to the Secretary of Transportation.

(3) The Department shall not require as a prerequisite to the issuance of a license to a minor under this section, that the father, mother, guardian, Division of Family Services case worker or court-ordered custodian who signs the minor's driver license application be present at the time the application is made by minor or sign the application at the offices of the Division of Motor Vehicle. The signing of the application and acknowledgment thereof, by the parent, guardian, Division of Family Services case worker or court-ordered custodian before a notary public or other person authorized to administer oaths shall be deemed sufficient to satisfy the requirements of this section. However, sponsors designated in paragraph (e)(2)d. of this section shall sign the minor's license application in the presence of a Division representative.

(4) The sponsor who signs the driver's license application on behalf of a minor has final authority to determine if the minor is capable of handling the responsibility of operating a motor vehicle and authority to designate who can supervise the minor driver per paragraph (c)(2) of this section. The sponsor who signed the application on behalf of the minor can withdraw their endorsement at any time until the minor reaches age 18, thereby canceling the minor's driving authority regardless of the type of permit or license held. If the court terminates the custody order and the minor subsequently resides with a parent in this State, then the parent may cancel the driving privileges of the minor under this section. To reinstate the canceled driving privileges, an approved sponsor must sign the application on behalf of the minor. When the minor turns 18, they can reinstate their previously held driving privileges without a sponsor's signature. The applicant can reinstate the driving privileges of a canceled license when they meet the license requirements and pay the appropriate license fee.

(5) It shall be unlawful for any person to sign the application of a minor under the provisions of this section when such application misstates the age of the minor or

misrepresents the sponsor's relationship to the minor. Any person who violates this provision shall be guilty of a class B misdemeanor, and both the minor applicant and the sponsor's driving privileges shall be suspended for 2 months per § 2733(a)(5) of this title.

(6) It is unlawful for a sponsor to knowingly allow the holder of a Level 1 Learner's Permit to drive in violation of paragraph (c)(2) of this section. A sponsor who violates this provision is guilty of an unclassified misdemeanor.

(f) Out-of-state driver license transfer. -- A person who is at least 16 years old but less than 18 years old, who was a resident of another state and has a driver's license issued by that state, and who becomes a resident of this State may obtain Delaware driving authority under the following conditions:

(1) If the applicant was issued the out-of-state driver's license for less than 12 months, they are eligible to apply for a Level 1 Learner's Permit when meeting the requirements under subsection (b) of this section and successfully completing a driver education training program approved by the Delaware Department of Education.

(2) If the applicant was issued the out-of-state driver's license for over 12 months, and has successfully completed a driver education training program approved by the Delaware Department of Education, that applicant is eligible to apply for a Class D operator's license after meeting the requirements of subsection (e) of this section. Additionally, such a minor applicant must pass a written and road skills examination conducted by the Division.

(3) If the applicant holds an out-of-state driver's license and that applicant is over 18 years old, that applicant can apply for a Delaware Class D operator's license under §§ 2712 and 2713 of this title.

(g) Duration and fees. -- A Level 1 Learner's Permit expires 12 months after the date of issuance. If the applicant's learner's permit expires, the permit shall be void. The permit can be reissued when the applicant meets the permit requirements. The applicant must pay the $25 Class D license fee at the time of initial application.

(h) It is unlawful for the holder of a Level 1 Learner's Permit to operate a motor vehicle in violation of the restrictions that apply to the Level 1 Learner's Permit. Failure to comply with these restrictions constitutes operating a motor vehicle without a license under § 2701(a) of this title.

(i) The Division shall not issue an operator's license or Level 1 Learner's Permit to a person who has not reached the person's 18th birthday at the time of the offense if the person has been adjudicated delinquent as a result of acts which would constitute such an offense if committed by an adult as set forth in § 2732(a) of this title.

(j) The Department may immediately suspend a minor's permit, license and/or driving privileges whenever the Department has reason to believe that such person is a reckless or negligent driver of a motor vehicle or has committed a serious moving traffic violation. The Secretary may promulgate policy regulations more stringent than those that apply to other drivers when suspending minors. The suspension period will be for l month for the first suspension and 3 months for subsequent suspensions under this subsection. No suspension under this section shall be used by a motor vehicle insurance company licensed to sell insurance in this State as a basis for canceling a policy of insurance or to raise the premium cost to the insured.

(k) Driver education learner's permit. -- The Division, upon receiving proper notice that a person is currently enrolled in a driver's education course and successfully completed the minimum class hours of actual driving experience and in-the-car observation as approved by the Department of Education, may issue a driver education learner's permit to such person after the person's 16th birthday, provided the person meets all other Division requirements. The Division may issue a driver education learner's permit to those minors who meet the requirements of this section and need supervised driving experience before completing the road skill test. The 5-year driver license fee shall be collected at the time of the application. The permit is valid for 4 months. If for any reason whatsoever the applicant fails to pass the required examinations during the 4-month period granted by the permit, the permit shall be void and the driver license fee shall be forfeited. The

application must be signed by the sponsor pursuant to subsection (e) of this section.

(1) Any person issued a driver education learner's permit pursuant to this subsection is entitled to drive a motor vehicle described in § 2702(d)(1) of this title upon the highways only when supervised by a properly licensed parent or guardian. If the parent(s) or guardian(s) is (are) not licensed to operate a motor vehicle or the permit holder is in the custody of the Department of Services for Children, Youth and their Families, the holder of the driver education learner's permit must be supervised by a licensed driver who is 25 years of age or older and have held a Class D drivers license for at least 5 years. The supervising driver must be seated beside the permit holder in the front seat of the vehicle when it is in motion. No person other than the supervising driver can be in the front seat.

(2) The driver education learner's permit must be in the possession of the permit holder.

(3) No passengers other than the adult supervisor and 1 or fewer other passengers can be in the vehicle. However, this passenger limit does not apply to members of the driver's immediate family.

(4) Driving experience obtained while holding this permit will be counted towards and in conjunction with the driving experience restrictions contained in subsection (c)(3) of this section.

(5) The permit holder shall not operate a motor vehicle while using a cellular telephone, text messager, or substantially similar electronic device. This paragraph shall not apply if the permit holder has stopped the vehicle at a location off of the lanes of travel. Any permit holder found to be in violation of this paragraph is deemed to be operating the vehicle in a negligent manner and is subject to the penalties set forth in subsection (j) of this section.

36 Del. Laws, c. 10, § 56; 37 Del. Laws, c. 10, § 17; Code 1935, § 5594; 41 Del. Laws, c. 228, § 2; 44 Del. Laws, c. 192; 45 Del. Laws, c. 285; 21 Del. C. 1953, § 2708; 50 Del. Laws, c. 262, § 1; 53 Del. Laws, c. 221, § 20; 56 Del. Laws, c. 390, § 2; 58 Del. Laws, c. 511, § 44; 59 Del. Laws, c. 327, § 2; 62 Del.

Laws, c. 156, § 1; 62 Del. Laws, c. 237, § 19; 64 Del. Laws, c. 355, § 1; 65 Del. Laws, c. 77, §§ 1, 2; 67 Del. Laws, c. 25, §§ 1, 2; 69 Del. Laws, c. 327, § 1; 70 Del. Laws, c. 186, § 1; 71 Del. Laws, c. 282, § 1; 72 Del. Laws, c. 344, §§ 1, 2; 72 Del. Laws, c. 477, §§ 1, 3, 4; 73 Del. Laws, c. 42, § 1; 74 Del. Laws, c. 110, §§ 56, 57; 74 Del. Laws, c. 324, § 1; 75 Del. Laws, c. 15, §§ 1, 2; 75 Del. Laws, c. 377, § 1-3; 76 Del. Laws, c. 76, § 21; 76 Del. Laws, c. 260, §§ 5, 6; 76 Del. Laws, c. 293, § 1; 76 Del. Laws, c. 415, §§ 1-5.;