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Evaluation of the Kentucky Graduated Driver Licensing System

prepared by

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16. Abstract Kentucky's current GDL program, which applies to drivers up to age 18, was enacted in 1996. The program includes a six-month instruction permit for drivers under age 18 (minimum age 16), a restriction on driving between midnight and 6am and a requirement for adult-supervised driving for permit drivers. In addition, there is a six-point limit on traffic violations with a penalty of license suspension for drivers under age 18, a requirement for a four-hour driving safety education class (or driver education course) and a 0.02 ml/dl limit on blood alcohol concentration (continues up to age 21). <i>Objectives:</i> The objectives of this program evaluation were: (a) to examine teen driver motor vehicle crashes, crash-related injuries, and crash-related costs before and after the implementation of the GDL program; (b) to examine the implementation of the program at the local level; and (c) to recommend actions to enhance the program's effectiveness in addressing the teen crash problem. <i>Methods:</i> Crash and licensing data before (1993-1995) and after GDL (1997-2000) were analyzed. Data on miles driven were obtained from driving logs of over 1,000 high school students. Estimation of the cost of crashes was derived from analysis of crash data using the <i>CrashCost</i> computer software program. Information on local implementation of GDL was obtained through interviews and through a questionnaire survey of 700 law enforcement officers and over 40 district judges. <i>Results:</i> Results indicate a 31 percent reduction in crashes for 16 year-old drivers after the GDL program, and a similar reduction in fatal crashes (31 percent) and injury crashes (33 percent), crashes between midnight and 6am (36 percent), and alcohol-related crashes (32 percent). Cost analysis indicates an estimated reduction of \$36 million per year in 16 year-old teen driver crash-related expenses. Results indicate that this is due to the 83% reduction in the number of 16 to 16 1/2 year-old drivers involved in crashes. However, the number of crashes has not been reduced for drivers over age 16 1/2, i.e. drivers who may be past the permit level. In addition, the six-point limit on traffic violations and the non-cumulative penalties on 0.02 blood alcohol limit violations have not reduced the number of traffic violations or alcohol-related crashes for teen drivers over age 16 1/2. <i>Recommendations:</i> The six-month permit level has been successful in substantially reducing crash-related injuries and fatalities and should be retained. Additional measures, such as upgrading to an expanded GDL program, are needed to reduce crash-related injuries and fatalities for 16 1/2 to 18 year-old drivers. Specific recommendation are made to increase parental awareness and enforcement of program provisions.			
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EXECUTIVE SUMMARY

Kentucky enacted a Graduated Driver Licensing (GDL) program in 1996. The goals of the GDL program are to reduce teen driver crashes and fatalities by protecting new drivers from hazardous situations while they learn to drive, increasing teen driving experience and skills and motivating teens to drive safely. This report describes changes in teen driver motor vehicle crashes and related costs and presents results from an examination of the implementation, impact and support of the program at the local level. Recommendations to enhance the effectiveness of Kentucky's GDL Program are presented.

Kentucky's Current Graduated Driver Licensing Program

Kentucky's GDL program applies to drivers under age 18. The program includes a six-month instruction permit level, which may start at age 16. The permit level includes a restriction on driving between midnight and 6am, a requirement for adult-supervised driving and a six-point limit on traffic violations with a penalty of license suspension. The intermediate level includes a six-point limit on traffic violations (license suspension penalty) and a requirement for a four-hour driving safety education class (or driver education course). In addition, blood alcohol concentration limits (BAC) are lower (0.02 ml/dl) for drivers under age 21.

Using current NHTSA guidelines, Kentucky's GDL program is not considered a "full" GDL program due to lack of the following three provisions: a) a visibly distinguishable intermediate level license b) a limitation on unsupervised nighttime driving in the intermediate level, and c) a requirement to be free of traffic violations for a period of time before progressing to the next level of licensure.

Procedures

Crash and licensing data before (1993-1995) and after GDL (1997-2000) were obtained from the Kentucky Accident Reporting System (KARS) database and the Kentucky Transportation Cabinet Driver License file. Data on miles driven were obtained from two-week driving logs of over 1,000 high school students. Estimation of the cost of crashes involving teen drivers was derived from analysis of crash data using the *CrashCost* computer software program. Information on local implementation and impact of GDL was obtained from interviews with 100 persons, including judges, law enforcement officers and parents and through a questionnaire survey of 700 law enforcement officers and over 40 district judges.

Results and Analysis

In summary, results from this study indicate that Kentucky's six-month permit level has substantially reduced crashes for drivers age 16 to 16 1/2. There have been no reductions for teen drivers over age 16 1/2 under Kentucky's GDL program.

Results indicate a 30 percent reduction in crash rates for 16 year-old drivers after the GDL program, and a similar reduction in fatal crashes (31 percent) and injury crashes (33 percent), crashes between midnight and 6am (36 percent), and alcohol-related crashes (32 percent). Cost analysis indicates an estimated reduction of \$36 million per year in 16 year-old teen driver crash-related expenses. This translates into approximately 36 lives saved and 2,600 injuries prevented for this age group in the first four years of this program. These reductions are due to the 83 percent decrease in number of 16 to 16 1/2 year old drivers involved in crashes. However, the number of crashes has not been reduced for teen drivers over age 16 1/2 who may be past the permit level. The six-point limit on traffic violations has not resulted in a reduction in the number of traffic violations for drivers age 16 1/2 to 17. Crashes and alcohol-related crashes have not been reduced for 17, 18 and 19 year-old drivers under Kentucky's program.

For 16 to 16 1/2 year-old drivers (permit level) drivers, the average number of crashes occurring during the hours of midnight to 6am (restricted hours for permit level drivers) has been reduced 73 percent since GDL and has decreased 6 percent for the 17 to 18 year-old age group. For 1998 through 2000, 24 percent of fatal crashes involving 16 year-old drivers occurred from 9pm to 12pm (the hours before the driving restriction starts). In addition, for crashes involving passengers, the oldest passenger was under 21 years old in 88 percent of fatal crashes involving 16 year-old drivers. Over 40 percent of

persons with fatal and incapacitating injuries were not wearing safety belts in crashes involving 16 and 17 year-old drivers. Examination of crash data revealed substantial non-compliance with the adult supervision requirement and the nighttime driving restriction.

Surveys respondents and interview participants noted a widespread lack of awareness of the nighttime driving restriction. A substantial number of teens had few hours of driving practice during the permit level. This may result in insufficient driving experience and insufficient protection from risks for some permit level drivers. The penalty of license suspension after several traffic violations and non-cumulative penalties for repeat offenders of the 0.02 BAC DUI law may not be a sufficient deterrent to unsafe driving. Efforts should be made to increase parental enforcement of restrictions that are difficult for law enforcement agencies to monitor, such as the nighttime driving restriction and the adult supervision requirement.

Recommendations

The extended six-month permit level which may start at age 16 has been successful in substantially reducing crash injuries and fatalities for 16 to 16 1/2 year-old drivers and should remain in Kentucky's GDL program. However, additional measures are needed to reduce crashes for ages 16 1/2 to 18. Results indicate Kentucky's current GDL program is not effectively addressing crashes and injuries related to the higher risk situations, i.e. nighttime driving, multiple teen passengers and not using restraints, for those in the intermediate license level. Many states are addressing these issues with full GDL programs, which are more expansive in requirements. The following recommendations were made as a result of this study.

Primary Goals to Improve Effectiveness of Kentucky's GDL Injury Prevention Program

- Reduce risk exposure during the learning stages and increase motivation for safe driving.
- Improve teen driving skills and increase driving experience.
- Improve GDL provision compliance and enforcement (especially by parents).

Upgrade to a Full GDL Program through Legislation

- Add a clearly delineated intermediate license level with a visually distinguishable license, creating three distinctive licensing levels for young drivers
- Require permit and intermediate level drivers to be free of traffic violations for a minimum of six-months before progressing to the next level of licensure.
- Prohibit unsupervised nighttime driving between the hours of 10pm and 5am during the intermediate level (driving to/from work or school is permitted anytime).
- Restrict the number passengers under age 21 during the intermediate level.
- Require a minimum of 50 hours of driving practice (10 hours at night) during the permit level
- Require the existing educational component to be completed before progressing past the intermediate level.
- Strengthen penalties for permit and intermediate level violators of Kentucky's safety belt law.

Facilitate Enforcement

- Require stronger penalties for repeat 0.02 BAC DUI offenses by teen drivers.
- Allow a teen's 0.02 BAC DUI violation history to be accessible to courts who are processing teen DUI cases.
- Require parent/guardian to be notified of the teen's traffic violations.

Provide Focused Education

- Provide education regarding GDL provisions to parents, local law enforcement, judicial agencies and communities.
- Provide increased teen education aimed at improving teen driving safety/skills and motivating teens to drive more safely. Provide education either through GDL, and/or supplemental to GDL, in school programs or through driver education courses.

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Advisory Panel Members

Representatives from areas with direct input into the young driver safety process in Kentucky. Their task was to offer advice regarding evaluation plan, evaluation data and dissemination of project findings.

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1.0 INTRODUCTION

Kentucky enacted a Graduated Driver Licensing (GDL) program in 1996 (House Bill 400). Legislation to establish GDL programs with three stages has now been passed in thirty-five jurisdictions in an attempt to reduce the high rate of motor vehicle crashes involving teen drivers. Prior to the GDL program, Kentucky consistently ranked among the top ten states in teenage death rate from motor vehicle crashes.¹ These high crash rates for teen drivers are related to inexperience, immaturity and risky behavior. The goals of the GDL program are to reduce teen driver crashes and fatalities by protecting new drivers from hazardous situations while they learn to drive, increasing teen driving experience and skills, and motivating teens to drive safely. This report describes changes in teen driver motor vehicle crashes and crash-related costs after GDL and presents results from an examination of the implementation, impact and support of the GDL program at the local level. Recommendations to enhance the effectiveness of Kentucky's GDL Program are presented.

1.1 Provisions of the Kentucky's Current Graduated Driver Licensing Program

The restrictions and requirements of Kentucky's GDL program for teen drivers are briefly summarized below. Although there are three levels of licensure in Kentucky, there is no special driver's license for the intermediate level. Therefore, the driver's license given to a teen who passes the instruction permit level, is valid to age 21. Following is a description of levels in Kentucky's current GDL program.

Instruction Permit Level (Provisions apply to drivers under age 18)

- Minimum age 16
- Minimum six-months driving instruction permit
- Must be accompanied by a licensed driver at least 21-years-old
- Prohibited from driving between midnight and 6 am (with exceptions for work, school, etc.)
- License may be suspended for persons who accumulate more than six points for driving violations

Intermediate Level (From permit level to age 18)

- Driver training course required within the first year of the intermediate level (high school, private or state traffic safety course)
- License may be suspended for drivers who accumulate more than six points for driving violations

For drivers under age 21

- Blood alcohol content (BAC) of the driver cannot be more than 0.02 ml/dl
- Six-month permit required

Kentucky's current GDL program does not meet either the National Highway Traffic Safety Administration guidelines for a model GDL program or minimum requirements listed for GDL programs under Section 410 funding. Kentucky's GDL Program is not considered a "full" GDL program due to lack of the following three provisions: a) a visibly distinguishable intermediate level license, b) a limitation on unsupervised nighttime driving in the intermediate

level, and c) a requirement to be free of traffic violations for a period of time before progressing to the next level of licensure.

2.0 OBJECTIVES

The evaluation objectives were: (a) to examine crashes, crash-related injuries, and crash-related costs involving teen drivers in Kentucky before and after the implementation of the GDL program; (b) to examine the implementation, impact and support of GDL at the local level; and (c) to use data collected as part of the study to recommend actions to enhance the effectiveness of the Kentucky program.

3.0 PROCEDURES

There were six major components of this evaluation. The study involved collection and analysis of (a) crash data, (b) licensing and traffic violation data, (c) miles driven data, (d) calculation of teen crash costs, (e) interviews with those who implement GDL, and (f) judicial and law enforcement questionnaire surveys. Following is a description of the methods used for each component.

3.1 Teen Crashes, Licensing Patterns and Traffic Violations Before and After GDL

Motor vehicle crash data were collected for the years preceding (1993-1995) and the years following (1997-2000) the 1996 enactment of Kentucky's GDL program. Data for fatal, non-fatal, and property-damage-only crashes were acquired through access to the Kentucky Accident Reporting System (KARS) compiled by the Kentucky State Police (KSP). The 2000 data are contained in the CRASH (Collision Report Analysis for Safer Highways) database. These databases contain the traffic accident reports from all law enforcement agencies in Kentucky. This study examined crashes involving about 1.5 million drivers, including about 210,000 drivers ages 16 to 19. The Kentucky Transportation Cabinet Driver Licensing file was the source of data for number, status and age of licensure.

Analysis of crash data and driver data was conducted to determine crash rates and characteristics of teen drivers compared to control groups before and during the GDL program. More detailed analysis was conducted of crashes in the 16 to 16 1/2 year-old age group (which requires an instruction permit and adult supervision), and the 16 1/2 to 17 year-old age group (which may be in the intermediate level of licensure). Two control groups were examined: Kentucky drivers age 19 and Kentucky drivers over age 19. Crash frequencies were compared for peer groups across periods before and after GDL to develop a basis for longitudinal evaluation of the impact of GDL on drivers and crashes. Biannual data on the number of licensed drivers was obtained from the Kentucky Transportation Cabinet's Division of Driver Licensing. Comparison data controlled for changes in the number of licensed drivers by examining drivers involved in crashes per 1,000 drivers in the age group and crashes per license status (permit vs. licensed). Fatal, injury and non-injury crashes were examined to identify characteristics and

trends in addition to evaluating the effectiveness of specific GDL provisions. Fatal crash reports for 16 year-olds were examined in detail after GDL.

Kentucky's GDL program was enacted in October 1996, resulting in a 1996 mix of new 16 year-old drivers who were and those who were not under the provisions of the program. In addition, GDL research had revealed a significant increase in the number of learner (permit) licenses issued before the GDL program was initiated, causing a distortion in the number of licenses normally issued per month.² Therefore, crash data for 1996 were not included in this comparison. Table 1 shows the variables examined using licensing and crash data.

TABLE 1. EVALUATION OF KENTUCKY GDL: VARIABLES EXAMINED

SET	YEARS	VARIABLES EXAMINED
Drivers age 16, 17, 18, 19, 16-19, Over 19 involved in crashes	1993-1995 1997-2000	Total crashes, fatal crashes, injury crashes, crashes midnight-6am, alcohol-related crashes and by highway district (includes 1996 data)
Crashes with drivers age 16, 17, 18, 19, 20, 21 or older	1993-2000	Total number of crashes by gender of driver, Males
Crashes with drivers age 16- 16.5 16.5 to 17	1993-1999	Total crashes, crashes between midnight and 6am, crashes with oldest passenger under 21 years of age, alcohol-related crashes
Crashes with drivers age 16, 17, 18, 19, 16-19, Over 19	1994-2000	Crashes per 1,000 Drivers
16 with permit 16 with license 17, over 19	1998, 1999	Crashes per 1,000,000 Miles Driven
Crashes with drivers age 16	1993-2000	Number of total and fatal/injury crashes involving driver only, and number of passengers
Crashes with drivers age 16	1993-1995 1996-1999	Day of the week, time of day (6-hour segments), month, light conditions, road conditions, number of vehicles and highway district
Drivers age 16	1994-1999 biannually	Number of drivers (age 16) with permit, number with license, and total number of drivers
Crashes with drivers age 16, All occupants with 16 year-old driver involved	1993-2000	Crashes with fatal, incapacitating, non-incapacitating and possible injuries
Fatal Crashes Involving 16 year-old drivers	1998-2000	Type of crash, time of day, number of passengers, age of oldest passenger, age of each passenger, age of driver in months, day of the week
Crashes Between Midnight and 6am with driver age 16-16 1/2	1998-1999	Time of day, day of week, number and age of passengers, type of crash, number of vehicles
Crashes with drivers age 16	1997-2000	Hour of crash, fatal and injury crash
Crashes with drivers age 16, 17	1993-1999	Total and fatal/injury crashes in single, two and over two vehicle crashes
Crashes with drivers age 16, 17 And 16, 17 plus occupants---	1993-2000	Restraint use (categories from fatal to no injury crashes)
Crashes with drivers age 16- 16.5 (1st six Months) 16.5 to 17 (2nd six months)	Percent change from 1993-1995 Average to 1998 to 2000	Total crashes, number of passengers, two or more passengers all under age 21, oldest passenger under 21, crashes midnight to 6am, crashes midnight to 6am Saturday and Sunday, alcohol-related crashes.
Drivers age 16, 17, 18, 19, 20 and 21	6/30/1994 to 6/30/00	Number of drivers by age for dates
New teen drivers	1999	Time between obtaining a license and completing GDL course

TABLE 1. EVALUATION OF KENTUCKY GDL: VARIABLES EXAMINED

SET	YEARS	VARIABLES EXAMINED
New teen drivers	Permit Before 10/1/96 Permit After 10/1/96	Percent of drivers with a license in each month after acquiring permit
New teen drivers	Permit Before 10/1/96 Permit After 10/1/96 1st and 2nd six months after acquiring permit	Days between permit and violation/crash per 1,000 drivers Days between permit and crashes per 1,000 drivers Violations/1,000 drivers during 1st and 2nd six months, Crashes/1,000 drivers during 1st and 2nd six months
Crashes with drivers age 16	1993-2000	Crash costs for driver and for driver and all occupants
New teen drivers	1999	Time between obtaining a license and completing GDL course

3.2 Miles Driven by Teen Drivers with Instruction Permits and Licenses

To control for differences in the amount of time permit drivers and licensed drivers are exposed to driving situations, crash rates using the number of miles driven were also examined. For this database, driver education instructors in public Kentucky high schools were requested by mail to participate in obtaining information on the number of miles driven by teens enrolled in their courses. The GDL education requirement must be completed within the first year after the new driver obtains a regular driving license. This requirement can be met through a driver education course in the high school, a four-hour course arranged through Eastern Kentucky University, or certified private driving schools. In Kentucky, a high school driver education course is optional, not a requirement for obtaining a license, and is not offered by all high schools.

Miles driven information was acquired through two-week driving logs maintained by the students in high schools across the state as part of their driver education course. All driver education teachers were requested to obtain this information. Data were received from 55 percent of the counties offering high school driver education courses at the time of the study. Because the data were only from students in a driver education class, the sample could not be considered random and can only be used to give general trends. The sample represented a convenient method of collecting this type of data for a large sample of teenage drivers. The logs detailed the number of miles driven each day of the week during specific time periods: 6am-6pm, 6pm-midnight to midnight-6am. In addition, information on age, license status, gender and model of car was also collected. Completed two-week mileage logs were received from 1,255 students of driver's education courses. Refer to Appendix A for the two-week teen driving log data collection tool.

3.3 Cost of Teen Motor Vehicle Crashes Before and After GDL

An economic analysis of teen crashes was conducted using the computer software program *CrashCost* (available from the NHTSA Office of Plans and Policy) to derive cost estimates of crashes.³ Law enforcement officers categorize crash-related injuries based on the KABCO system for categorizing severity of crashes. KABCO statistics were obtained for all reported crashes involving 16 year-old drivers. *CrashCost* translated KABCO statistics into Maximum Injury Severity level (MAIS) frequencies. Costs for non-fatal injuries were calculated

based on the standardized Abbreviated Injury Scale (AIS) for categorizing injury type and severity. MAIS was used to index acuity because multiple injuries may have been present. *CrashCost* used both indirect and direct costs to individuals and society resulting from deaths and injuries attributed to crashes. Direct costs included emergency treatment, initial medical costs, rehabilitation costs, long-term care costs, insurance administrative expenses, legal costs and employer/workplace costs. Indirect costs addressed productivity losses in the workplace and home due to temporary and permanent disability. Estimates for property damage and travel delay were also included.

3.4 Interviews: GDL Implementation, Impact and Support of GDL at the Local Level

Groups were identified who were responsible for local implementation of the Kentucky GDL program, or who would be expected to be impacted by the program. All driver educators, district judges, police chiefs, sheriffs, licensing clerks and emergency department supervisors from local hospitals were identified from state and local directories (primary participants). Insurance agents and employers of teens were randomly selected from local directories (primary participants). Employers were from randomly chosen large retail stores, fast-food restaurants, large grocery stores, health care facilities, county teen employment programs and school summer employment programs. Additional participants (secondary participants) were randomly selected from those working in the agencies, business, hospitals or schools where interviews with primary participants had been conducted. Structured interviews by the same person were conducted with 100 participants (Refer to Appendix B for Interview Participant Table and Interview Guides for each category of participant). The majority of participants were audio-taped (n=87) and sessions were transcribed (anonymity ensured). Detailed field notes were taken on sessions with those who refused to be audio-taped. Teens were given surveys to be mailed back anonymously regarding knowledge of GDL, compliance with GDL, and attitude toward GDL to supplement qualitative data gathered from the teen interviews.

Transcripts from the interviews were entered into the QRS NU*DIST ([Non-numeric Unstructured Data Index Searching and Theorizing] Rev. 4; Qualitative Solutions & Research Pty., Ltd., Melbourne, VI AU) qualitative data analysis computer software program for coding and sorting. Text (over 10,000 lines of text excluding interviewer statements) was coded line by line and analyzed to identify re-occurring themes across interviews, counties and sub-groups of participants. Hard copies of five transcripts were supplied to project personnel to assess inter-rater reliability. There was 99 percent agreement between the investigator category coding patterns.

3.5 Surveys: Judicial and Law Enforcement Support of Recommendations and Issues

To determine if the results from the interviews reflected the opinions of a larger group, questionnaires for judges and for law enforcement officers were developed based on issues and recommendations identified in the interviews and from the analysis of crash data. Survey packets were sent to district judges in all 59 judicial districts in Kentucky, all 16 Kentucky State Police (KSP) Posts, KSP Licensing officers, and distributed to law enforcement officers (police and sheriff) at random state training classes. Completed questionnaires were returned from 43 district judges, 412 KSP officers (approximately 80 percent of non-administrative officers in

Kentucky) and 300 city and county police officers attending classes. Refer to Appendix C for the judicial and law enforcement officer questionnaires.

4.0 RESULTS AND ANALYSIS

4.1 Impact on Crashes, Licensing and Traffic Violations

4.1.1 Change in Number of Drivers Involved in Crashes

Under GDL, crashes involving 16 year-old drivers were reduced substantially. The number of 16 year-old drivers involved in motor vehicle crashes decreased 31 percent from before GDL (1993-1995) to after GDL (1997-2000) with a similar reduction in fatal crashes (31 percent), injury crashes (33 percent), crashes between midnight and 6am (36 percent), and alcohol-related crashes (32 percent). During the same time period, drivers in age groups over age 16 did not have a reduction in total crashes. Comparing the average number of 16 year-old drivers involved in crashes before and after GDL, crashes were reduced 36.9 percent for males and 27.7 for females.

Table 2 summarizes the changes in the number of drivers involved in crashes for the study and control groups. Alcohol-related crashes were not reduced for drivers over age 16. However, crashes between midnight and 6am have been reduced 6 percent for the 17 to 18 year-old age group. Refer to Appendix D for detailed crash and licensing data tables.

TABLE 2. DRIVERS INVOLVED IN CRASHES BEFORE GDL (1993-1995) AND AFTER GDL (1997-2000)

	DRIVER AGE	1993-1995 AVERAGE CRASHES PER YEAR	1997-2000 AVERAGE CRASHES PER YEAR	PERCENT CHANGE WITH GDL
Total MVC's	Age 16	6,493	4,452	-31.4
	Age 17	7,920	8,678	9.6
	Age 18	8,278	8,905	7.6
	Age 19	7,552	8,210	8.7
	Ages 16-19	30,243	30,245	0.0
	Over age 19	180,406	194,204	7.6
Injury MVCs	Age 16	2,004	1,336	-33.4
	Age 17	2,367	2,519	6.4
	Age 18	2,539	2,563	0.9
	Age 19	2,281	2,369	3.9
	Ages 16-19	9,191	8,786	-4.4
	Over age 19	31,552	31,670	0.4
Fatal MVC's	Age 16	29	20	-31.0
	Age 17	31	40	29.0
	Age 18	42	38	-9.5
	Age 19	35	42	20.0
	Ages 16-19	137	140	2.2
	Over age 19	650	670	3.1

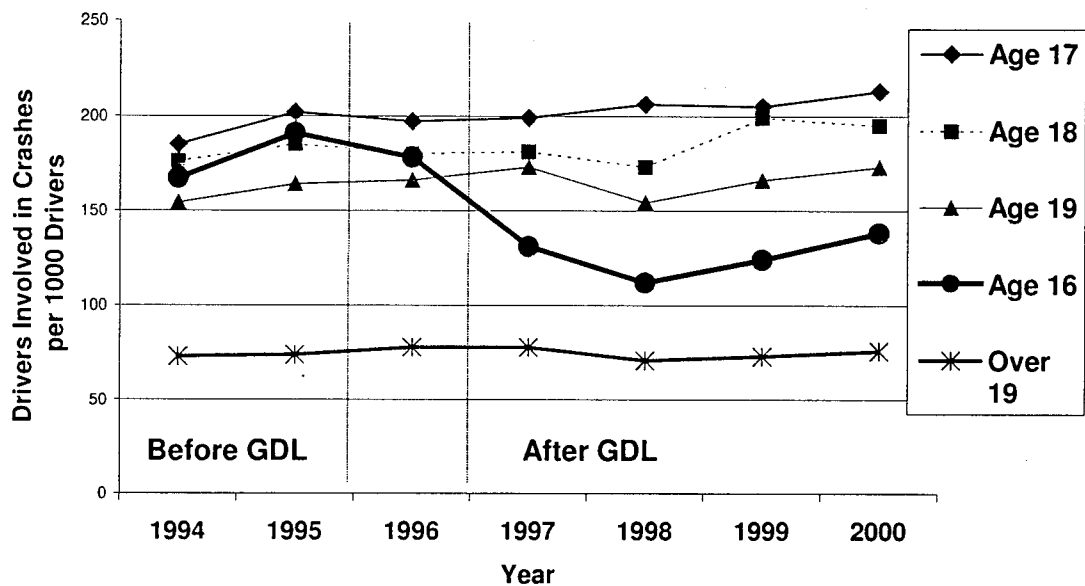
TABLE 2. DRIVERS INVOLVED IN CRASHES BEFORE GDL (1993-1995) AND AFTER GDL (1997-2000)

	DRIVER AGE	1993-1995 AVERAGE CRASHES PER YEAR	1997-2000 AVERAGE CRASHES PER YEAR	PERCENT CHANGE WITH GDL
Crashes Midnight to 6am	Age 16	269	172	-36.0
	Age 17	408	372	-8.8
	Age 18	599	578	-3.5
	Age 19	601	599	0.3
	Ages 16-19	1,877	1,722	-8.3
	Over age 19	7,240	7,215	-0.3
Alcohol-related Crashes	Age 16	95	65	-31.6
	Age 17	156	165	5.8
	Age 18	222	222	0
	Age 19	233	251	7.7
	Ages 16-19	706	703	-0.4
	Over age 19	5,167	4,800	-7.1

4.1.2 Change in Crash Rates

Under GDL, the crash rate for 16 year-old drivers was substantially reduced, but the crash rate for teen drivers overall was not significantly changed. Crash rates were determined using the number of drivers in an age group involved in crashes per 1,000 drivers (permit and licensed) in the age group, in order to control for the effect of changes in the number of drivers. Figure 1 compares the crash rates before and after GDL for teen drivers and the control groups.

Figure 1 Drivers Involved in Crashes per 1000 Drivers in Age Group



The crash rate for 16 year-old drivers after GDL (1997-2000) was reduced 29.6 percent compared to the crash rate before GDL (1994-1995). The crash rate increased 6.3 percent for 17 year-old drivers, 3.6 percent for 18 year-old drivers, and 4.7 percent for the 19 year-old control group. The crash rate for the 16 to 19 year-old age group decreased 2.3 percent. During this same time period, the crash rates increased 1.4 percent for drivers in the "over age 19" control group.

4.1.3 Change in Number of Crashes for 16 year-old Groups

The lower crash rates for 16 year-olds were related to the 83 percent decrease in the number of 16 to 16 1/2 year-old drivers involved in crashes (Table 3). All legal drivers in this age group require a permit and adult supervision. The number of 16 1/2 to 17 year-old drivers involved in crashes increased 3.2 percent after GDL. An average of 72 percent in this group have progressed to the independent intermediate level of licensure. The number of alcohol-related crashes, crashes between midnight to 6am and crashes with all passengers less than age 21 after GDL for the two age groups are shown in Table 3.

TABLE 3. CHANGE IN THE NUMBER OF CRASHES FOR 16 TO 16 1/2 AND 16 1/2 TO 17 YEAR-OLD DRIVERS AFTER GDL

CATEGORY	PERCENT CHANGE	
	FROM 1993-1995 AVERAGE TO 1997-2000 AVERAGE	
	AGE 16 TO 16 1/2	AGE 16 1/2 TO 17
All Crashes	-83	+4.4
Oldest Passenger Under 21	-90	-20.6
Crashes Midnight to 6am	-72.5	+4.5
Alcohol-related Crashes	- 52.7*	+13.8*

*Note: Alcohol data is based on crash reports from law enforcement officers

Figure 2 compares crashes before GDL and after GDL involving drivers ages 16 to 16 1/2 (supervised instruction permit level) and ages 16 1/2 to 17. After GDL, a substantially larger number of drivers were involved in crashes in the 16 1/2 to 17 year-old age group compared with the younger group.

4.1.4 Change in the Number of Crashes and Traffic Violations for Permit Drivers

After GDL, both crashes and violations were substantially reduced for drivers during the first six-months of their permit license level. License file data was used to examine license status of drivers receiving traffic violations and involved in crashes. For drivers obtaining a permit before GDL compared to drivers receiving a permit after GDL, the crash rate (crashes per 1,000 drivers) was reduced 88 percent while the traffic violation rate was reduced 76 percent during the first six months after the teen driver acquired a permit. Figure 3 illustrates this dramatic reduction in violations and crashes after GDL for drivers during their first six months of permit status. Figure 4 illustrates the increase in traffic violations (69 percent) and crashes during the six-to-twelve month period after teen drivers acquired a permit license compared to the first six-month period after acquiring the permit.

Figure 2

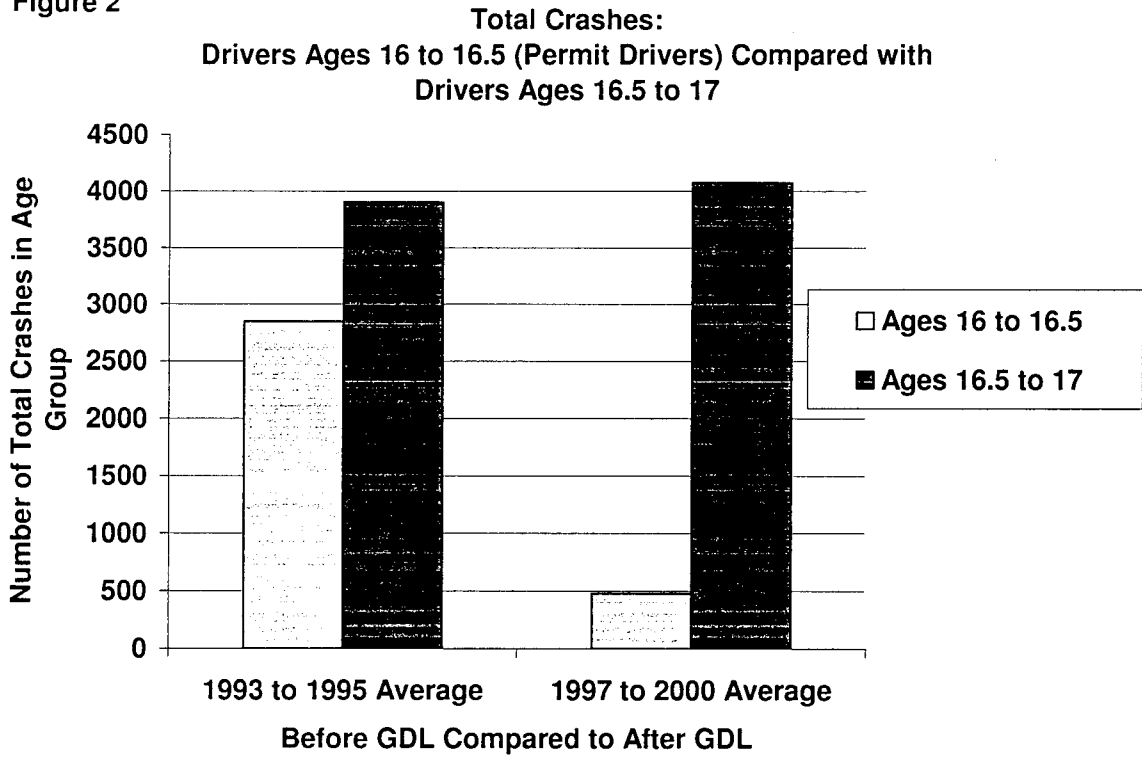


Figure 3

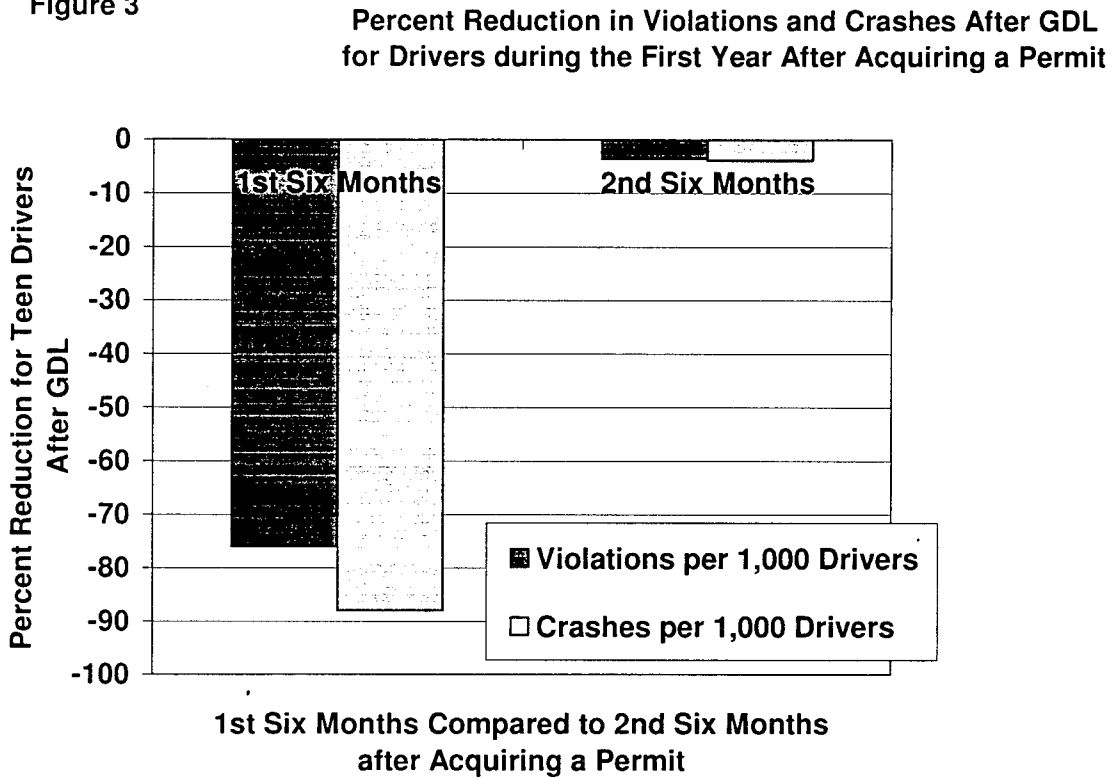
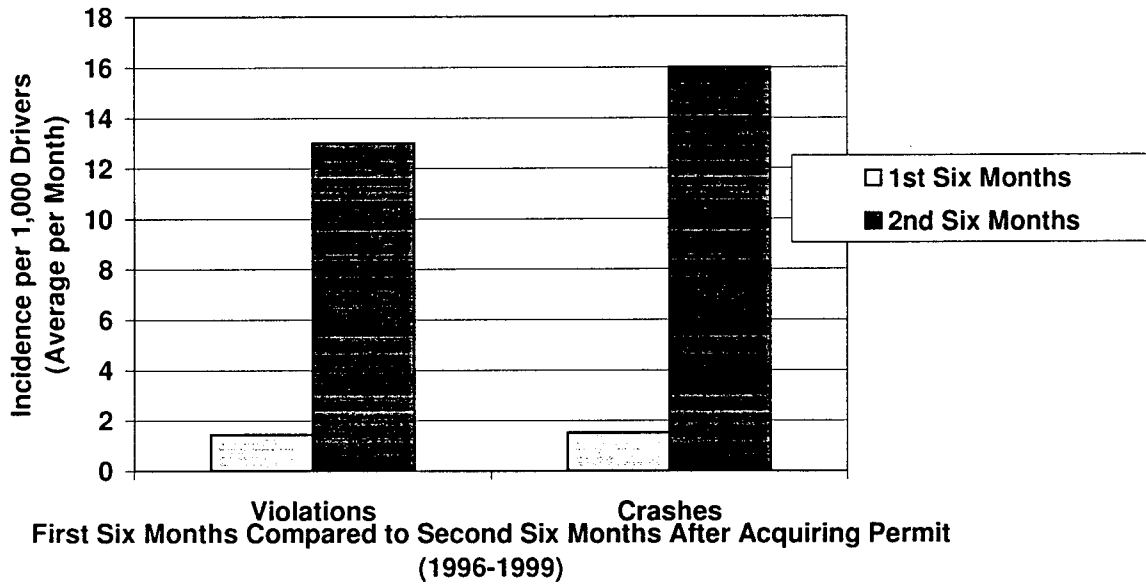


Figure 4

**Violations Compared to Crashes During the First Year
After Acquiring a Permit License (Under GDL Program)**



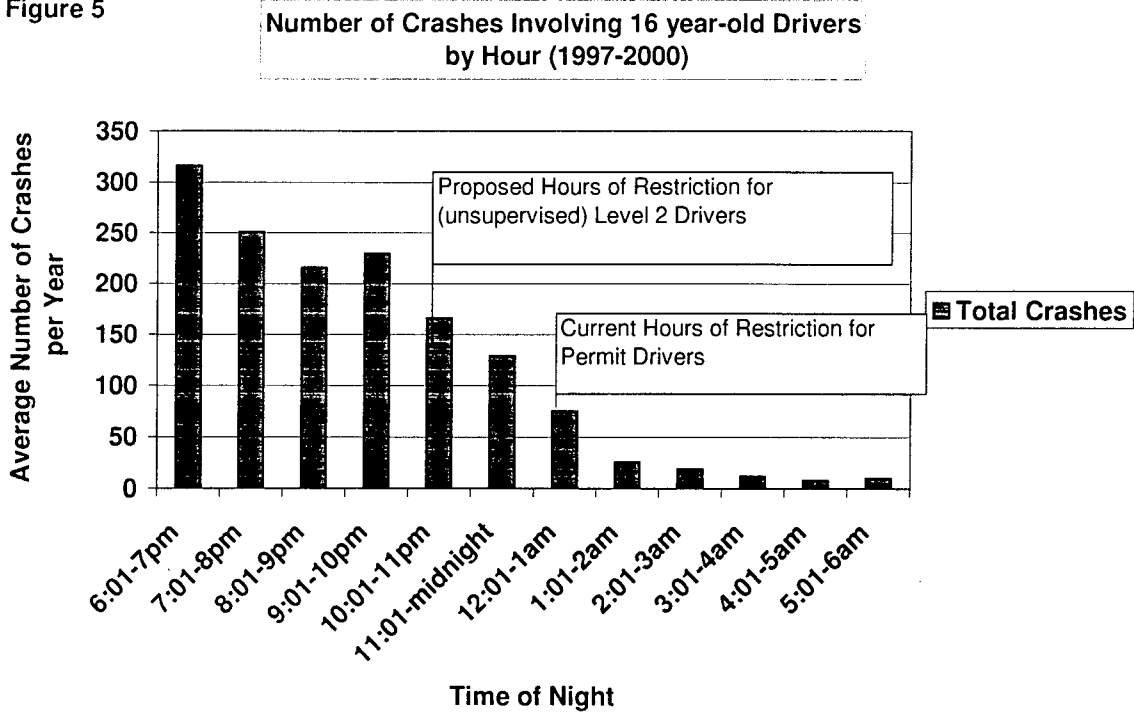
4.1.5 Crash Trends and Characteristics

Notable trends or patterns were identified for several variables studied, i.e. nighttime driving, crashes involving teen passengers, and restraint use in fatal and incapacitating crashes. Characteristics of crashes before and after GDL involving 16 and 17 year-old driver groups, as well as those for drivers ages 16 to 16 1/2 and 16 1/2 to 17, were examined to identify problem areas and establish baselines for future interventions.

Detailed analysis of all crashes involving 16 to 16 1/2 year-old drivers (instruction permit level) revealed a 73 percent reduction in the average number of crashes occurring during the hours of the nighttime driving restriction (midnight to 6am) for permit drivers after GDL. However, crashes were not reduced during these hours for those over age 16 1/2. For 1998 through 2000, 24 percent of fatal crashes involving 16 year-old drivers occurred during the hours 9pm to midnight (before the driving restriction starts). Figure 5 shows the relatively higher percentage of total crashes for 16 year-olds between 9pm and 1am compared to crashes between midnight and 6am (the hours of the current nighttime driving restriction for permit level drivers).

Because a driver stopped in Kentucky for another violation may receive an additional citation for not using a safety belt, self-reporting of safety belt use by drivers involved in a crash is not considered a reliable source of safety belt usage. However, more reliable data on safety belt usage would be expected for reports involving fatal and incapacitating injuries. Forty-five percent of persons with fatal and incapacitating injuries after GDL were not wearing safety belts in crashes involving 16 year-old drivers. The trend is consistent over the four years after GDL with a variance of only one percentage point or less.

Figure 5



Teen passenger involvement in teen driver crashes was also noteworthy. For crashes involving passengers, the oldest passenger was under 21 years of age in 88 percent of fatal crashes involving 16 year-old drivers. However, the percent of driving time that drivers are only with passengers under age 21 is unknown. Data on trends in alcohol-related crashes for teen drivers are inconclusive due to the small sample size and large variance from year to year. Alcohol-related crashes for 16, 17, 18 and 19 year-old drivers combined account for less than 2.3 percent of the total crashes for this age group.

4.1.6 Violations of GDL Provisions

Analysis of crashes involving 16 to 16 1/2 year-old drivers (permit level) indicates permit level provisions were being violated. The absence of an adult passenger in 24 percent of crashes for this age group shows substantial non-compliance with the adult supervision requirement for permit drivers. Furthermore, 15 percent of crashes in this age group occurred during the restricted nighttime hours (midnight to 6am). In addition, 22 percent of young drivers did not complete the GDL educational requirement within the first year after obtaining a regular license.

4.1.7 Change in Number and License Status of Drivers

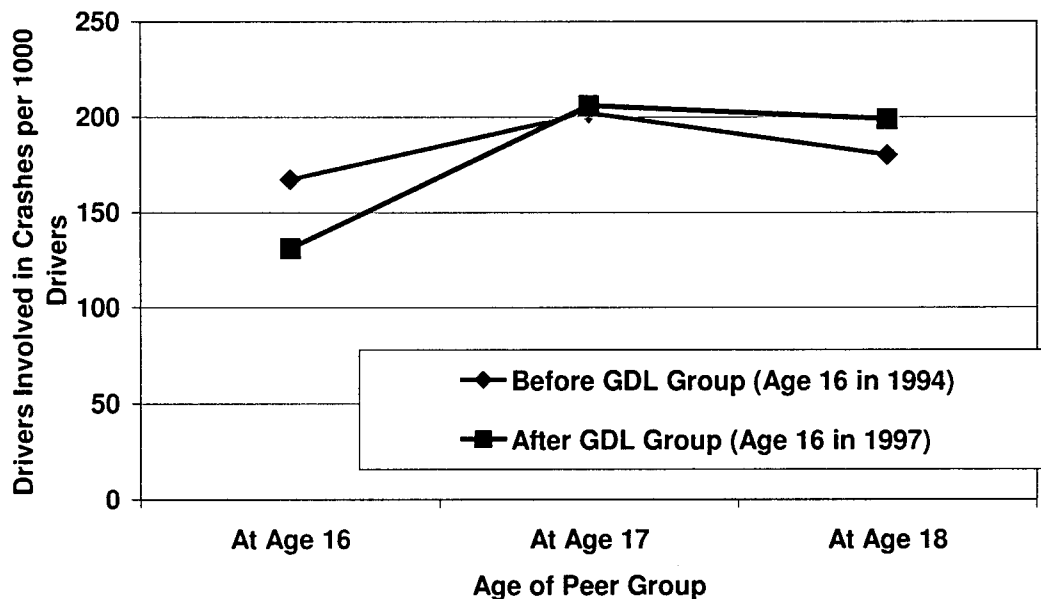
Overall, there was little change in the total number of 16 year-old drivers (2.8 percent decrease) after GDL. The number of licensed and permit 16 year-old drivers was examined before and after GDL to determine if a difference in exposure relating to a change in licensing patterns in this age group was a factor in the crash reduction. After GDL, the proportion of 16 year-old drivers with permits increased by 31 percent.

GDL has not substantially affected the amount of time between acquiring a permit and licensure for teen drivers. Prior to GDL, 71 percent of teen drivers had acquired a license within seven months after acquiring a permit. After GDL, 65 percent had acquired a license within seven months. By one year after acquiring a permit, there was little difference in the percent of drivers who had acquired a license: 86 percent of those starting to drive before GDL, and 89 percent of those starting to drive after GDL, had acquired a license by the end of the first year.

4.1.8 Comparison of Long-term Crash Rates for Peer Group

Long-term crash rates have not been reduced for teen peer groups beginning to drive under Kentucky's current GDL program, as shown in Figure 6. Crash rates were compared over a three-year period for both the "before GDL" peer group (age 16 in 1994) and for the "after GDL" peer group (age 16 in 1997). Despite a lower crash rate initially (when age 16), the crash rate for the "after GDL" peer group surpassed the crash rate for the "before GDL" peer group in the second year (when age 17) and third year (when age 18). Specifically, the crash rate for the "after GDL" peer group at age 18 was 10.6 percent higher than the crash rate for the "before GDL" group at age 18.

Figure 6
Comparison of Crash Rates
for Peer Groups Before and After GDL



4.1.9 Crashes by Region

Crashes in all age groups according to highway district were examined in the years before and after GDL to determine if the effects of GDL varied by region in the state. No trends by region were noted. Refer to Appendix D for crash data by highway district.

4.2 Miles Driven by Teen Drivers

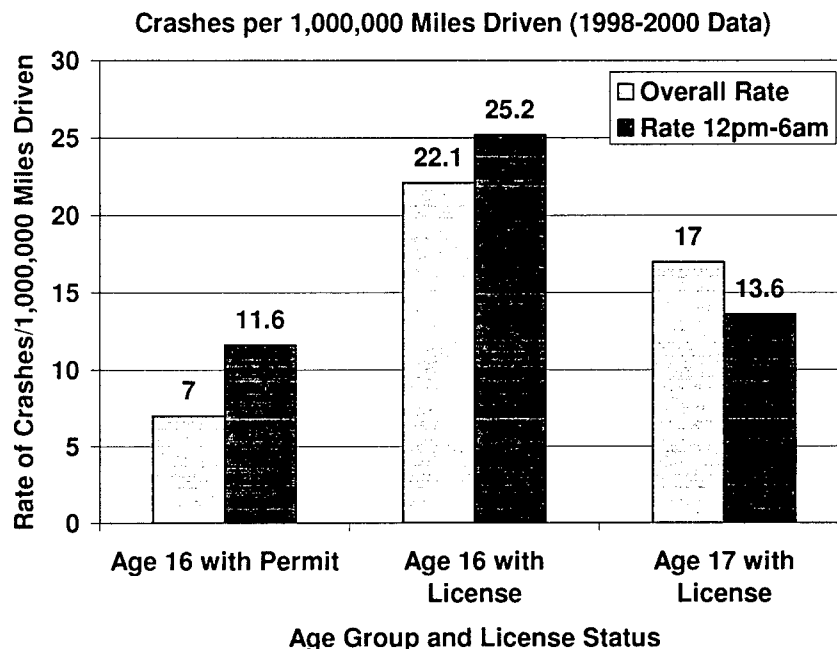
Results from analysis of student logs suggest that crash rates (crashes per miles driven) are higher for 16 year-old drivers after they proceed from a permit to a license. The number of miles driven by teen drivers was examined to determine if the difference in the amount of time the drivers were exposed to driving situations was a factor in the change in the number of crashes. Data from the two-week logs of a sample of 1,175 teens enrolled in high school driver education courses across the state were analyzed to determine average miles driven per day of the week for each age group (16 to 18 years of age), license status (permit or license), and gender. Data were divided into six-hour time periods. Table 4 summarizes the data acquired from the two-week teen driving logs and illustrates the 60 percent less exposure (miles driven) for the permit age group.

TABLE 4. SUMMARY OF TWO-WEEK DRIVING LOGS

LICENSE STATUS	GENDER	NUMBER OF TWO-WEEK DRIVING LOGS	AVERAGE MILES DRIVEN PER YEAR
Driving Permit	Male	259	3,551
	Female	371	3,655
Driver License	Male	217	11,309
	Female	192	9,960

Crash rates were calculated using crashes per 1,000,000 miles driven for age groups and license status. Figure 7 summarizes the rate of crashes per 1,000,000 miles driven for permitted and licensed 16 year-old drivers.

Figure 7

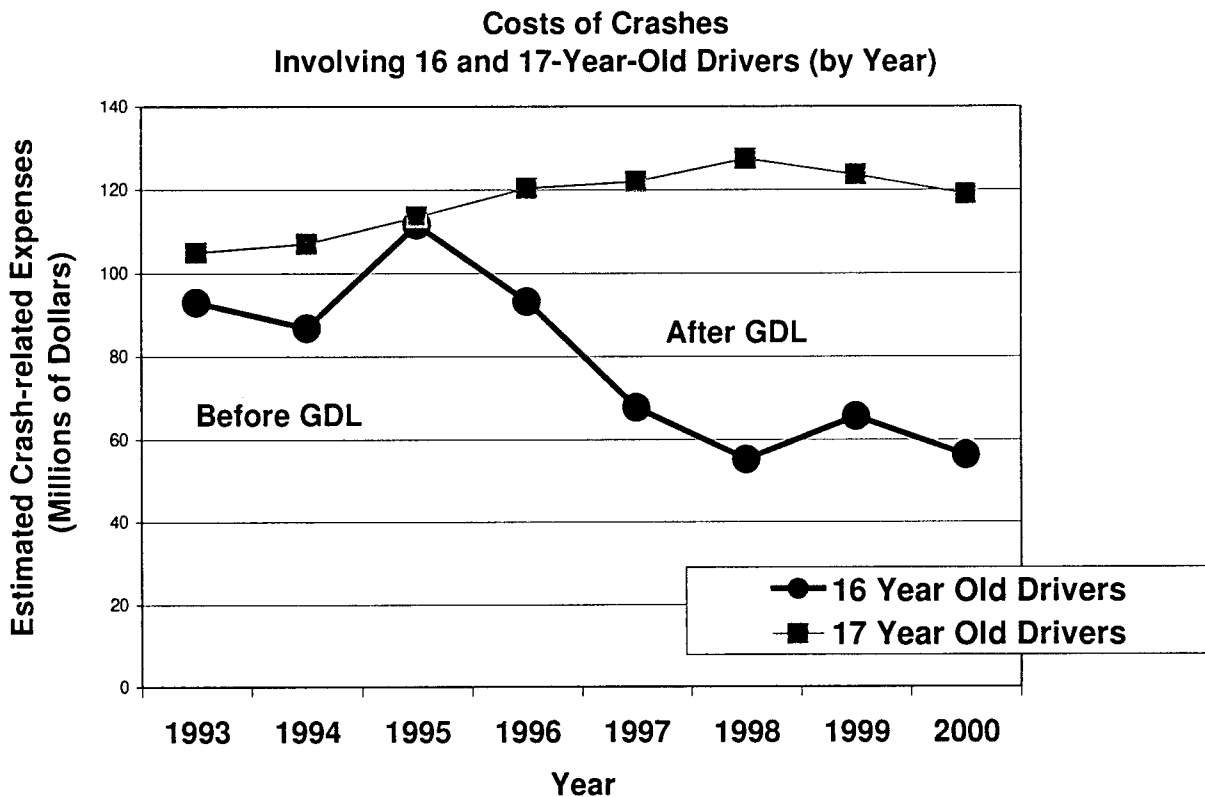


Sixteen year-olds with a license had three times more crashes per miles driven than 16 year-olds with a permit. In addition, there was a substantial increase in crashes per miles driven for 16 year-old drivers between the hours of midnight and 6am. It should be noted that the data were obtained from students in driver education classes in 32 high schools. While this sample does not represent a random sample of teenage drivers, it provided a convenient method of collecting this type of data for a large sample of teenage drivers. Because drivers enrolled in high school driver education courses may have different characteristics than those who fulfill their GDL education requirement through private or state driving schools, the sample can be used to reflect general trends but does not represent a sample based on an equal probability design plan.

4.3 Impact on Teen Motor Vehicle Crash Costs

Economic analysis using the *CrashCost* computer software program indicated an estimated average annual reduction in crash-related expenses from before GDL (1993 through 1995) to after GDL (1997 through 2000) of \$35.5 million for all occupants in crashes involving a 16 year-old driver. For crashes involving 17 year-old drivers, these estimated average annual costs increased \$14.5 million for all occupants. Figure 8 illustrates the substantial decrease in crash-related expenditures for 16 year-old drivers. The calculations used 1994 economic assumptions from NHTSA and were expressed in 1997 economics for Kentucky. Refer to Appendix E for detailed results of *CrashCost* analysis for 16 and 17 year-olds before and after GDL.

Figure 8



Estimated savings in costs of crashes involving 16 year-old drivers greatly exceeds the cost of GDL administration. Based on the Kentucky Transportation Cabinet budget, total expenditures for maintenance and administration of Kentucky's GDL were approximately \$500,000 to \$620,000 per year. Time expenditures and employee costs vary for employees involved in planning and implementing GDL as part of their duties. Expenditures include costs associated with publishing, postage, maintaining the drivers license file for the "point system", processing suspensions and reinstatements, GDL program promotion and the four-hour GDL educational component.

In 1999, employee expenditures associated with the mandatory four-hour class for newly licensed drivers included; (a) salaries for four part-time field coordinators and 60 part-time instructors in 120 counties teaching 1,700 classes, (b) instructor certification workshops and mandatory annual in-service workshops for each instructor, and (c) mileage for instructors driving more than 40 miles one way to teach a course. Class expenditures also included scheduling of 47,000 students according to instructor and class site availability by Eastern Kentucky University, processing 28,000 students who attended the course and providing GDL workbooks used to enhance the students retention of lecture material. Schools (171) and other sites (8) volunteered classroom space and equipment for teaching GDL to 16 and 17 year old drivers in their area.⁴

4.4 Interviews and Surveys of Persons Implementing and Impacted by GDL at the Local Level

Themes from the 100 interviews of persons implementing or impacted by the GDL program were generated based on groupings of related categories with substantial coding (Refer to Appendix B). Results from the questionnaire survey, conducted in 2001, of 700 law enforcement officers and over 40 district judges revealed substantial support for many of the issues identified by those interviewed in 1999. Survey results are summarized in tables in Appendix C.

4.4.1 Lack of Knowledge

Three-fourths of those interviewed, from all four counties and all sub-groups, made statements indicating lack of awareness regarding one or more of the GDL provisions, GDL purpose, or indicating misconceptions regarding the law, especially the nighttime driving restriction. Ninety-two percent of 700 law enforcement officers and 90 percent of judges surveyed through questionnaires noted substantial unawareness of the GDL nighttime driving restriction for young permit drivers.

Comments from teens, parents and licensing clerks indicated that the parent/guardian is often not aware of the contents of the GDL orientation and driving instruction booklet which the teen and guardian are given at the time of applying for a driving permit. Many were not aware that they were expected to provide extensive driving instruction to their teen. While observing the permit process in all four counties, it was noted that no licensing clerk in any county was observed instructing the parents regarding GDL provisions or the GDL instruction booklet that was given to the teen driver.

4.4.2 Fines and Suspensions

Insufficient penalties for repeat 0.02 BAC DUI offenders. District judges and law enforcement officers interviewed revealed that Kentucky judges may be unaware of a teen's previous convictions for exceeding the 0.02 ml/dl blood alcohol concentration (BAC) limit while driving and may not be able to acquire a 0.02 BAC conviction history for a current teen DUI case. Kentucky GDL law requires that the driving history records related to a license suspension for a 0.02 BAC violation cannot be released (must be masked) and must be destroyed (purged) completely within five working days after the teen's operator's license has been reinstated. The absence of a provision for stronger penalties (cumulative penalties) for repeat offenders of the 0.02 BAC law was a primary concern for the judicial group in three of the four counties. Another primary concern for the judicial sub-group was the absence (at the time of the interviews) of a provision for alcohol evaluation and education, such as exists for adults convicted of alcohol offenses. More than 95 percent of the officers surveyed through questionnaires felt that the following recommendations would improve the enforcement and compliance with Kentucky's GDL program: a) increase penalties for repeat teen offenders of Kentucky's 0.02 BAC DUI law; and b) allow a teen's record of previous 0.02 BAC DUI violations to be accessible to courts.

Adverse consequences of license suspension. Responses from the judicial branch indicated that the penalty of suspended license that can be administratively imposed for multiple traffic violations (the six-point traffic violation limit in GDL law) often resulted in the additional problem of persons driving without a license and losing their insurance. The penalty of license suspension placed a burden on the court system. Persons were later seen in court on subsequent violations for driving without an operator's permit and driving without insurance. Eighty-two percent of law enforcement and 88 percent of district judges surveyed agreed with this issue.

Primary impact of penalties not on teen driver. Comments from parents, law enforcement, the judicial sub-group, and insurance agents indicated the greatest impact of current Kentucky GDL penalties, i.e. fines and suspensions, was on the parent, not the teen driver. The majority of insurance agents indicated that a license suspension that came to their attention would significantly impact the parent's automobile insurance coverage and often resulted in minimal liability coverage. Insurance agents stated that if a teen driver was involved in a vehicle crash while driving on a suspended license, an insurance claim might be denied.

4.4.3 Enforcement Disparities/ Difficulties

Range of Enforcement of 0.02 BAC DUI law. Interview responses indicated that enforcement of the 0.02 BAC limit ranged from strict to lenient. Teens, law enforcement officers and judicial participants reported few to zero citations were given for violations of the nighttime driving restriction provision (or adult supervision requirement) except in a county that already had an established teen curfew law. Judicial and law enforcement participants expressed concern that teen licenses in Kentucky could be easily altered to allow underage purchase of alcohol. More than 95 percent of officers and 78 percent of judges surveyed through questionnaires felt that Kentucky should make teen driver licenses less easily altered. It should be noted that Kentucky is now addressing this issue.

Barriers to primary enforcement of the nighttime driving restriction. More than 500 of officers surveyed through questionnaires responded that it was difficult to enforce the nighttime driving restriction. Sixty-four percent of officers interviewed and 63 percent of officers surveyed through questionnaires reported they believed they could not legally stop a driver who is suspected to be in violation of the nighttime driving restriction or the adult supervision requirement for permit drivers. They believed this did not constitute "probable cause" (i.e. a legal justification for making a traffic stop), because permit status could not be determined until after the officer stopped the driver and checked the driver's license. If the driver proved they had a regular license rather than a learner's permit, the initial cause for the stop would become invalid because the restriction would not apply. About half of law enforcement and judges surveyed through questionnaires felt charges (e.g. drug paraphernalia, open alcohol container) made after a stop for a nighttime driving restriction violation would be dismissed in court if, after the stop, the driver proved to have a regular license which did not restrict nighttime driving.

Difficulty identifying drivers under GDL restrictions. Law enforcement officers in three counties stated that a decal or placard to identify a vehicle driven by a permit driver would facilitate enforcement of permit level provisions. About half of officers surveyed felt that a requirement for new teen drivers to display a decal or sign (identifying them as a novice driver under GDL provisions and restrictions) would be an improvement to Kentucky's GDL program.

Parents not enforcing GDL provisions. The majority of judicial participants, teen and law enforcement participants stated that they were aware of parents (10 to 20 percent) who were obviously not enforcing GDL provisions, especially the nighttime driving restriction. Judicial participants and law enforcement officers recommended increasing the parents' awareness, accountability, motivation, and responsibility for enforcing GDL provisions, especially the nighttime driving restriction.

Inadequate quantity and quality of driving instruction. Teens and driver education instructors indicated that 50 to 90 percent of teens they knew were not getting adequate driving experience or quality driving instruction from their parents/guardians during the six-month permit phase. A suggestion was to require the parent/guardian to certify that the teen has received a minimum number of hours of driving practice during the instructional permit level.

Parents not aware of teen's traffic violations. Judges interviewed noted the problem of lack of parental awareness of the teen's citations. Ninety percent of the law enforcement officers and 80 percent of the judges surveyed agreed with this issue. Judges interviewed also noted the absence of parents in the courtroom for traffic offenses. Over eighty percent of those surveyed agreed that the teen's parent or guardian was not usually required to accompany the teen in court for a traffic violation. Judicial sub-group participants stated that a parent may not know of violations and "points" accumulated by their teen until they received notice of license suspension. More than 92 percent of those surveyed felt that a provision requiring parents to be notified of their teen's traffic violations would help improve Kentucky's GDL program. Eighty percent of judges and over 90 percent of officers surveyed felt that courts should be allowed to require the presence of parents or guardians when their teen was in court for traffic violations.

4.4.4 Recommendations for Education

Statements from the majority of interview participants identified a need for increased education. These statements constituted the largest number of text units and were made in response to the question "What else can Kentucky do to help decrease the number of teen crashes in Kentucky?".

Education for judges and law enforcement officers. An average of 80 percent of law enforcement officers surveyed felt education for law enforcement officers, judges and prosecutors would/might help improve the GDL program. Law enforcement officers interviewed recommended education of their peers through summary sheets, in-service education, yearly updates and legally correct "blue book" supplements. Special educational efforts were recommended to increase the awareness (and enforcement) of the nighttime driving restriction provision by law enforcement and parents. Participants recommended education of the judicial branch regarding GDL provisions, effective penalty options, and benefits of enforcement.

Education for teens. Ninety two percent of law enforcement officers surveyed felt specific educational efforts for teens would help improve the GDL program. All sub-groups (except employers and emergency health care providers) emphatically recommended an increased educational component of GDL or supplemental education for new teen drivers, both in the classroom and on the road, for promoting teen driving safety and driving skills beyond the existing four-hour GDL course.

Education for parents and communities. Eighty-three percent of law enforcement officers surveyed felt educational efforts directed to parents and local communities would help improve the GDL program. Interview participants stated this would increase the awareness of the teen driver crash problem, clarify GDL provisions and GDL purpose, and help motivate the sub-groups to increase GDL compliance and GDL enforcement.

Additional recommendations included media campaigns (newspaper, posters, and television) on a regular basis to keep the public informed of these issues. Additional suggestions for increasing compliance with the provisions included disseminating local and statewide statistics relating to nighttime and alcohol-related teen crashes and the impact of the GDL program. Law enforcement also requested crash statistics related to the GDL program for their school/community programs to increase public awareness of the positive effects of enforcement. Law enforcement officers and the judicial sub-group indicated that increased public and parental awareness might help to support, encourage and facilitate judicial and law enforcement efforts. They felt improved enforcement may, in turn, increase compliance.

4.4.5 Support of GDL

Interview participants, when asked about the individual provisions of Kentucky's existing GDL program, indicated 95 to 100 hundred percent support for the provisions. The 0.02 BAC limit and the four-hour driving safety course requirement received the strongest support.

4.4.6 Local Impact of GDL

Judges, law enforcement officers, driver educators, insurance agents, licensing clerks, and emergency department supervisors stated that the GDL program had not made any noticeable impact on their time, budgets, staffing, clientele or scheduling. Educators stated that they did not note any problems with the nighttime driving restriction in relation to school functions. Employers of teens stated the program had not affected scheduling or whom they hire. All stated, that because of policy or practice, 16 year-olds were not hired for positions requiring work after 10pm or 11pm.

4.4.7 Support for Proposed Restrictions in an Intermediate GDL Level

Eighty-five percent of the 700 law enforcement officers surveyed and 68 percent of district judges surveyed felt a restriction on the number of passengers for new teen drivers during the first six months of independent driving (family members would not be included in this restriction) "definitely would" or "might" be an improvement for Kentucky's GDL program. Eighty-five percent of officers and 63 percent of judges surveyed felt a restriction on unsupervised nighttime driving (after 10pm or 11pm) for this group "definitely would" or "might" be an improvement.

5.0 IMPLICATIONS

In summary, the six-month permit component of Kentucky's GDL program has substantially reduced crash-related injuries, fatalities and costs for permit age drivers. However, there is no current evidence that Kentucky's current GDL program, which does not meet NHTSA requirements for a full program, has sufficiently addressed the crash problem for teen drivers past the permit age. Crashes and traffic violations for drivers past the first six months of the permit level have not been reduced, indicating that the current GDL program has not improved young driver skills, has not increased their motivation to drive safely, and has not adequately protected the young driver from high risk situations while they learn to drive. Results from this study indicate a need for additional measures to reduce motor vehicle crash-related injuries and fatalities in the 16 1/2 to 18 year-old age group. More complete GDL programs in other jurisdictions include provisions which address these issues.

5.1 Substantial Crash Reduction Limited to Permit Age Drivers

Comparison of motor vehicle crash data before (1993-1995) and after (1997-2000) GDL indicates that Kentucky's program has been associated with a 31 percent reduction in crashes for 16 year-old drivers and similar reductions in crashes after midnight, fatal crashes, and injury crashes in this age group. The cost of crashes involving 16 year-old drivers was reduced an average of \$36 million per year with Kentucky's GDL program. This translates into approximately 36 deaths and 2,600 injuries prevented for drivers in this age group in the first full four years under the GDL program. The lower crash rates for 16 year-olds were related to the 88 percent reduction in crash rates for drivers during the first six-month period after acquiring a

permit license. Compared to drivers age 16 to 16 1/2, crashes are substantially higher for the 16 1/2 to 17 year-old age group. Crash rates, crash-related injuries, crash-related fatalities and crash costs have not been reduced for 17 or 18 year-olds.

The crash reduction for 16 year-old drivers is related to the extended permit period with GDL. Adult supervision, less exposure to high risk driving situations and less miles driven for permit level drivers appear to be factors in the decreased crash rates for 16 to 16 1/2 year-old drivers. Crash rates using the number of drivers indicate that the large reduction in number of crashes during GDL for the 16 year-old age group is not due to a substantial change in the number of drivers in this age group. The six-month delay in independent driving may also result in less experienced drivers (and higher crash rates) at ages 16 1/2 through 17 than for drivers the same ages before GDL. Results suggest that crashes per miles driven is higher for new drivers past the instruction permit level and, therefore, the increase in exposure is only partially responsible for the increase in the number of crashes for this group.

5.2 Nighttime Driving Restriction In Permit Level

Results indicate the nighttime driving restriction between midnight and 6am for instruction permit level drivers is not appropriately addressing the nighttime driving risk. The number of crashes and crashes per miles driven between midnight and 6am was substantially higher for drivers over age 16 1/2, who may no longer be in the permit level. Furthermore, a substantially higher percentage of crashes (24 percent of fatalities) occurred for 16 year-old drivers during the 9pm to midnight period than during the hours of the existing nighttime driving restriction (midnight to 6am). This indicates that a nighttime driving restriction starting at 9pm or 10pm for drivers in the intermediate level would be more effective in reducing crashes and fatalities.

5.3 Insufficient Protection from High Risk Situations for Drivers past the Permit Level

The current program is not reducing exposure to high risk driving situations for young drivers past the permit level, who no longer require adult supervision. In crashes involving 16 year-old drivers, almost one-half of persons with fatal and incapacitating injuries were not wearing safety belts. Of crashes involving passengers, all passengers were under age 21 in 88 percent of fatal crashes. Results indicate that increased protection from risks in the intermediate level in addition to increased enforcement (by parents and law enforcement) and compliance with provisions that reduce exposure to high-risk situations in the permit level might result in further reductions in crashes and severity of injuries.

5.4 Insufficient Experience and Awareness of Provisions

Results indicate there is a widespread lack of knowledge regarding the nighttime driving restriction and limited parental enforcement of the nighttime driving restriction and adult supervised driving instruction provision. This may result in insufficient driving experience and inadequate protection from high risk driving situations for some teens during the permit stage. Without a sufficient amount of driving experience in the permit stage, driving skills for those past the permit level may be inadequate. In addition, unawareness impairs the deterrent effect of the provisions.

5.5 Insufficient Motivation to Drive Safely

Current penalties are not having sufficient deterrent effect on teen drivers. The penalty of license suspension for exceeding the six-point limit (plus deferred violations) on traffic violations has not reduced the unsafe driving behavior that leads to traffic violations or crashes for those past the permit level. Current penalties for 0.02 BAC DUI violations have not reduced the number of alcohol-related crashes for 17 to 19 year-olds drivers.

6.0 RECOMMENDATIONS

6.1 Retain Kentucky's Extended Permit Stage

The six-month permit level, which may start at age 16, should be continued in Kentucky's GDL program because it has been effective in substantially reducing crashes and crash-related injuries and fatalities. The age at which a permit may be obtained should not be lowered to under age 16.

6.2 Improve GDL Program, Awareness, Enforcement and Compliance

Legislative enhancements are recommended to address crash trends, persistently high crash rates, and the high number of injuries for drivers ages 16 1/2 through 17. More complete, three-stage GDL programs in 35 jurisdictions are addressing these issues.⁵ Primary goals should be to increase the quantity and quality of the learning experience, reduce risk exposure, improve driving skills and increase motivation for safe driving. Kentucky should consider upgrading its current GDL program to a "full" GDL program with inclusions of the following provisions: (a) limiting the number and age of passengers (during the intermediate level); (b) limiting unsupervised nighttime driving (after 10pm during the intermediate level); and (c) requiring teens to be violation-free for at least six-months before being allowed to graduate to the next licensure stage. In addition, evidence of a minimal amount of supervised driving experience during the permit level should be required.

Effective legislation and educational efforts are also needed to improve compliance, especially with the adult supervision and safety belt requirements, facilitate enforcement and strengthen the deterrent effect of the program in order to further reduce the number of severe injuries and fatalities involving teen drivers. Research has revealed that parents feel the nighttime driving restriction is easy for them to monitor and enforce.^{6,7} Therefore, efforts should be made to increase parental enforcement of restrictions that are difficult for law enforcement agencies to monitor, such as the nighttime driving restriction and the adult supervision requirement.

Upgrade to a Full GDL Program through Legislation

- Add a clearly delineated intermediate licensing level, creating three distinctive licensing levels for young drivers.

Level 1. Instruction permit, six months minimum

Level 2. Intermediate license, six to twelve months minimum

Level 3. Full license

- Create a visually distinctive license for the intermediate level.
- Require teens to be without traffic violations for six-months before moving to the next level of licensure.
- Prohibit unsupervised nighttime driving between the hours of 10pm and 5am during the intermediate level (driving to/from work or school is permitted anytime).
- Restrict the number of passengers under age 21 during the intermediate level.
- Require a minimum of 50 hours of driving practice, with 10 hours of nighttime driving, during the permit level.
- Require the existing educational component to be completed before progressing to the full operators license level.
- Strengthen penalties for permit and intermediate level drivers who violate Kentucky's safety belt law.

Facilitate Enforcement

- Require the parent/guardian to be notified of the teen's traffic violations.
- Require stronger penalties for repeat alcohol (0.02 BAC) offenses by teen drivers.
- Allow a teen's 0.02 BAC DUI violation history to be accessible to courts when processing teen DUI cases.

Provide Focused Education

- Provide GDL education for local law enforcement/ judicial agencies.
- Increase parental motivation and responsibility to enforce provisions difficult for law enforcement to monitor, such as the nighttime driving restriction and the adult supervision requirement for permit drivers.
- Instruct parents/guardians regarding GDL purpose and provisions. Instruct parents on their expected role in enforcing GDL and providing teens with driving experience and skills instruction. Instruction to parent/guardian should be required at the time the parent/guardian gives permission for the teen to acquire the driving permit.
- Provide increased teen education aimed at improving teen driving safety/skills and motivating teens to drive more safely. Provide education either through GDL and/or supplemental to GDL, in school programs or through driver education courses.

Provide Education to Communities

- Conduct media campaigns focusing on the first six-months after the teen driver completes the permit level to inform parents about the need for close monitoring, skills training and the need to limit exposure to risky driving situations (such as driving late at night, with other passengers, in poor weather or while using cell phones). Encourage and support local community programs that motivate safe driving and improve teen driving skills.
- Conduct regular local media campaigns to disseminate GDL information and local/statewide teen crash statistics to help encourage enforcement, compliance and support for the GDL program at all levels.

7.0 FUTURE RESEARCH

If Kentucky's teen licensing program is legislatively upgraded to a full GDL system, another comprehensive program outcome and process evaluation should be conducted. In addition, research to determine the amount of time Kentucky teens drive with passengers, especially multiple teen passengers, would be useful in order to establish exposure rates and risk for these variables. Furthermore, a teen driving log that collects information on the time teens spend driving between the hours of 9pm and midnight would help determine the crash risk for Kentucky teens in the hours before midnight. These data could assist in determining the most beneficial hour to start a nighttime driving restriction for new teen drivers in Kentucky.

REFERENCES

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3. QRS *NU*DIST* ([Non-numeric Unstructured Data Index Searching and Theorizing] Rev. 4; Qualitative Solutions & Research Pty., Ltd., Melbourne, VI AU (computer software program).
4. Eastern Kentucky University, Richmond, Kentucky. *Graduated Licensing Program: Annual Report, 1999*. For the Kentucky Transportation Cabinet Division of Driver Licensing
5. Insurance Institute for Highway Safety, *U.S. Licensing Systems for Young Drivers*. Highway Loss Data Institute.
Available: http://highwaysafety.org/safety_facts/state_laws/grad_license.htm.
6. Mayhew DR, Simpson HM, Ferguson SA, Williams AF. Graduated Licensing in Nova Scotia: A Survey of Teenagers and Parents. *J Traffic Med* 1998 26(1-2):37-44.
7. Mayhew DR, Simpson HM, Ferguson SA, Williams AF. Graduated Licensing in Ontario: A Survey of Parents. *J Traffic Med* 1999 27(3-4):71-80.

Appendix A
Miles Driven Project Data Collection Form

This is a two-week homework assignment to collect information about your driving patterns. Please keep an account of the miles you drive each day by filling in the appropriate blocks of this form every day for a two-week period. It is important the information you provide be as accurate as possible; therefore, we ask that your driver education teacher check these diaries daily to ensure the most accurate accounting.

Please circle one correct response in each of the three categories below:

<u>I have a</u>	<u>I am</u>	<u>My age is</u>
Learner's permit	Female	16
Driver's license	Male	17
		18

The car I drive most often is: Make _____
 Model _____
 Year _____

The name of my High School is: _____

MILES DRIVEN EACH DAY DURING THE TIME PERIODS SPECIFIED

Week 1

Driving Period	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
6am to 6pm	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6pm to Midnight	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Midnight to 6am	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total Daily Miles	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Week 2

Driving Period	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
6am to 6pm	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6pm to Midnight	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Midnight to 6am	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total Daily Miles	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Appendix B
Interview Guides and Tables

TABLE B-1. INTERVIEW PARTICIPANTS

INTERVIEW PARTICIPANTS	COUNTY				TOTAL
	A	B	C	D	
Judges and Judicial support staff	2	4	3	2	11
Court clerk/ licensing	2	2	2	2	8
Law Enforcement Officers	4	2	6	2	14
Driver Instructors/ Educators	4	2	1	1	8
Insurance Agents	3	2	3	2	10
Emergency Health Care	2	1	0	1	4
Employers of Teens	3	3	2	3	11
Parents of Teen GDL Drivers	4	3	3	4	14
Teen GDL Drivers	5	5	5	5	20
Total	29	24	25	22	100

TABLE B-2. FREQUENCY OF THEMES IN INTERVIEWS

MAJOR THEME	LINES OF TEXT	SUB-GROUPS MOST OFTEN VERBALIZING THEME	
Enforcement Difficulties	500	54% of judicial 75% of educators	71% of law enforcement 70% of teens
Problems with Penalties	900	21% of parents 73% of judges	100% insurance agents 86% of law enforcement, 50% of driver educators
Lack of Knowledge (to varying degrees) regarding GDL/provisions	900	73% of judicial 86% of parents 75% of teens	93% of law enforcement, 88% of driver educators 80% of insurance agents
Recommendations for Education	1300	73% of judicial 79% of parents 65% of teens	86% of law enforcement 100% of driver educators

Graduated Driver Licensing (GDL) Evaluation: Interview Guides

Interview Guide: Judicial Officials

- Q: How has GDL affected whom you see in the courtroom?
GDL related citations? Sanctions imposed? Teen DUI?
- Q: What, if any, additional budget costs are required to implement GDL effectively in your county or district?
Costs? Revenue?
- Q: What type of positive feedback are you getting on GDL?
- Q: What problems have you encountered in implementing GDL?
- Q: Do you feel GDL is working effectively? Why or why not?
- Q: What changes would you recommend to improve law enforcement's ability to implement the program more effectively?
- Q: Is it possible to enforce the nighttime driving restriction for permit drivers? Why or why not?
- Q: Do you think parents need to take a more active role in enforcing the GDL program? In what areas? Please explain.
Nighttime? Age of accompanying passengers? Alcohol use?
- Q: What can Kentucky do to take a more active role in encouraging young drivers to drive more safely?

Interview Guide: Parent

- Q: How much does your son/daughter drive each week and for what reason?
Amount (time?) Distance (miles?)
- Q: What do you believe are the goals of the Graduated Driver Licensing Law?
- Q: Do you feel the GDL program is working as intended? Why or why not?
- Q: How do you feel about the driving restriction during the hours between midnight and 6:00 a.m. for permit drivers? Do you think parents need to take a more active role in enforcing this driving restriction? Why or why not?
- Q: How do you feel about the mandatory six-month duration for holding a permit before being allowed to have a full license?
- Q: How has your family adjusted to this rule?
- Q: Under the Graduated Driver Licensing Law, a teenager's driver's license can be taken away with only 7-points. This is 6-points less than it takes to remove an adult's license. What do you think about this?
- Q: Has your child completed the state-approved driver's education course? What do you think about this requirement?
Any difficulties finding or getting information on a course?
How did it affect your son's/daughter's driving?
- Q: The law now makes it illegal for a teenage driver to have any alcohol in their blood (0.02g/dL). What do you think about that?
- Q: Do you feel the GDL program is effective in providing teenage drivers more driving experience within a safer driving environment prior to full licensure? Why or why not?
- Q: What changes would you recommend to improve GDL? How would you change the law?
- Q: What do you think Kentucky should do to take a more active role in encouraging young drivers to drive more safely?

Interview Guide: Law Enforcement

- Q: Do you know about GDL (summary of law given and discussed)
- Q: What type of feedback are you getting?
- Q: How has GDL affected the police department? Who you pull over? Who you cite?
Teen DUI?
- Q: What, if any, additional budget costs are required to implement GDL effectively in your county or district?
Costs? Revenue?
- Q: What problems have you encountered in implementing GDL?
- Q: Do you feel GDL is working effectively? Why or why not?
- Q: What changes would you recommend to improve law enforcement's ability to implement the program more effectively?
- Q: Is it possible to enforce the nighttime driving restriction for permit drivers? Why or why not?
- Q: Do you think parents need to take a more active role in enforcing the GDL program? In what areas? Please explain.
Nighttime? Age of accompanying passengers? Alcohol use?
- Q: How many GDL related citations have you given?
- Q: What can Kentucky do to take a more active role in encouraging young drivers to drive more safely?

Interview Guide: Teenage Drivers

- Q: How much do you drive each week? Amount (time?) Distance (miles?)
Q: Why do you drive? What reason accounts for the largest percentage of your driving?
Commuting to and from school? Work related? Sports related? Other
Q: What do you believe are the goals of the Graduated Driver Licensing Law? Q: Do you think GDL is working as intended? Why or why not? Q: What do you think about the driving restriction during the hours between midnight and 6:00 a.m. for permit drivers? Q: Has this restriction created any problems for you personally?
Q: Do you think parents need to take a more active role in enforcing the driving restriction? Why or why not?
Q: How do you feel about not being able to get a license until you have had a permit for 6-months?
Q: How has your family adjusted to this rule?
Q: Under the Graduated Driver Licensing Law, a teenager's driver's license can be taken away with only 7-points. This is 6-points less than it takes to remove an adult's license. What do you think about this?
Q: Have you completed the state-approved driver's education course? What do you think about this requirement?
Any difficulties finding or getting information on a course? How did it affect your driving?
Q: The law now makes it illegal for teenage drivers to have any alcohol in their blood (0.02g/dL). What do you think about that?
Q: Do you feel GDL is effective in providing teenage drivers more driving experience within a safer driving environment prior to full licensure? Why or why not?
Q: What changes would you recommend to improve GDL? How would you change the law?
Q: What do you think Kentucky should do to take a more active role in encouraging young drivers to drive more safely?
Q: Within what areas of driving do you feel more training is needed?

Interview Guide: Driver's Education/ Educators

- Q: What impact has GDL had on driver's education in the high school?
More sections of a course? Revision of old courses? Development of a new course? Hiring of teachers?
Enrollees age, number, and gender? What impact has GDL had on driver's education in the Community?
More private driving training programs? Q: What differences have you noted in your students since GDL went into effect?
Q: What parts of the GDL Law do students discuss the most? What is the nature of these discussions?
Q: Does GDL help both rural and urban drivers? Please explain how it helps?
Q: How does the state-approved course relate to your course? Q: What is your opinion of the effectiveness of GDL?
Q: What changes would you recommend for GDL?

Interview Guide: Employers of Teenage Drivers

- Q: How has the Graduated Driver Licensing (GDL) Program for teenagers affected your business?
Does it affect those on certain shifts more and if so, which shifts? Who you hire and how you staff?
Permit drivers vs. licensed drivers? Higher or lower employee turnover? Working hours?

Interview Guide: Health Care Personnel

- Q: How has GDL impacted your E.D. Census? Q: Who you treat from MVCs? *Q: How acutely patients are injured from MVCs? Q: The type of resources these patients may need? Q: Busiest E.D. times, has this changed since GDL?
Q: After Midnight? (census & acuity) Q: Age of patients (teens) particularly in a teen driver MVC?
Q: Have you seen a change in the number of teenage drivers transported to the E.D. by ambulance since GDL?
Q: Can you give me a specific example of how GDL has made a difference in the health of teenagers and/or the type of injuries teenagers experience? *Q: Since The Graduated Driver's license law, teens can be cited for an alcohol level of .02 - how has this effected who you see in the ER?
*Q: Do you have any other thoughts on the Graduated license program, either for it or against it?

Interview Guide: Insurance Agent

- Q: How has the Graduated Driver Licensing (GDL) Program for teenagers affected your business?
Any change in the number or type of claims among teenage drivers? Any impact on workload?
Q: How has GDL affected the cost of insurance for teenagers? Q: How has GDL affected the type of coverage purchased by teenagers/parents? Q: What types of crashes are most common among teenagers? Head-on? T-bone? One car versus multi-car? Rear-end? Q: Has GDL affected the age at which teenagers obtain their permit?

Appendix C
Survey Questionnaires and Tables

Please Check Appropriate Box

I work in: Law Enforcement

Title: _____ (includes officers, police, sheriff, etc)

Recommendations* for Kentucky * to help Improve the Graduated Driver License (GDL) Program for New Teen Drivers		How Do You Feel About This Recommendation? Please Check Appropriate Box					Comments are Welcome	
		Definitely Would be an Improvement	Might be an Improvement	No Opinion/ I Prefer Not to Comment	Probably Would Not Help	May Cause Worse Problems		
*from Interviews with Law Enforcement Agencies, Traffic Court Judges, Prosecutors and Judicial Staff								
1. Provide education* to the law enforcement officers, judges and prosecutors implementing GDL. *This includes providing clear information on GDL purpose and provisions, their specific role in enforcement of the provisions, ideas on effective ways to enforce the provisions, and statistical results of their efforts.								
2. Require licensing agency to notify parents/ guardians of teen's traffic violations								
3. Require parents/guardians to accompany the teens when the teen driver is in court for traffic violations.								
4. Include a GDL provision to limit the passengers (number and age) for new teen drivers during their first six months of independent driving (family members would not be included in the restriction).								
5. Restrict unsupervised nighttime driving (after 10 or 11pm) for teens during the first six months of independent driving, except for work, school, church, etc.)								
6. Make driver's licenses for those under age 21 more difficult to alter to help decrease purchase of alcohol by minors using altered identification.								
7. Include a GDL provision to allow stronger penalties for teen drivers repeatedly convicted of DUI violations (0.02 BAC).								
8. Stop purging teen DUI violations (0.02 BAC) from the system, so that courts can be aware of previous DUI violations.								
9. Provide increased teen education on driving safety								
10. Conduct a media campaign to encourage parents to enforce provisions difficult for law enforcement to enforce. i.e. the "Nighttime Driving Restriction" and "Adult Supervisor/escort Requirement" for permit drivers								
11. Conduct a media campaign focusing on the first 6-months of independent teen driving, to inform parents about the need for close monitoring, skills training, and need for limit on passengers and driving privileges.								
12. Regularly disseminate local and statewide teen MVC statistics* *showing the severity of the teen crash problem and the progress towards reducing teen MVCs to help encourage enforcement, compliance and support for the GDL program at all levels								
13. Make driver's licenses for those under age 21 more difficult to alter* to help decrease purchase of alcohol by minors using altered identification								

Many concerns regarding enforcement of GDL provisions were expressed by law enforcement officers and judicial participants in our interviews.
Please check appropriate box

Comment	I agree	I disagree
It is hard to enforce the GDL nighttime driving restriction for permit drivers		
Many people do not know about the GDL nighttime driving restriction for permit drivers		
A suspicion of violation of the nighttime driving restriction does not constitute "probable cause" for stopping a vehicle		
If a person was initially stopped for suspicion of a permit license violation (such as nighttime driving restriction or not having an adult escort), but turned out to have a license, any subsequent charges made during that stop might have to be dismissed in court		
The penalty of license suspension on teen drivers can result in persons being seen back in court for driving without a license and driving with no insurance		
Our area prefers to avoid imposing the penalty of license suspension and prefers to quickly reinstate suspended licenses (not including alcohol cases)		
The teen's parent/guardian may not know of the teen driver's traffic violations		
The teen's parent/guardian is not required to accompany the teen in court for a traffic violation		

Do you work in an area that has an existing night time curfew? (not related to GDL)

Yes No

Please Check Appropriate Box
I work in: Judicial Agency

Title: _____ (includes judge, prosecutor, support staff, etc)

Recommendations for Kentucky to help Improve the Graduated Driver License (GDL) Program for New Teen Drivers *from Interviews with Law Enforcement Agencies, Traffic Court Judges, Prosecutors and Judicial Staff	How Do You Feel About This Recommendation? Please Check Appropriate Box				
	Would be an Improvement	Might be an Improvement	No Opinion/ I Prefer Not to Comment	Probably Would Not Help	May Cause Worse Problems
1. Include a GDL provision to allow stronger penalties for teen drivers repeatedly convicted of DUI violations (.02 BAC law).					
2. Allow a teen's record of previous DUI violations to be accessible to the courts (BAC 0.02 to 0.08 dl/ml).					
3. Allow courts to require the presence of parents (guardians) when teens are in court for traffic violations.					
4. Require licensing agency to notify parents/ guardians of teen's traffic violations					
5. Make drivers under age 18 ineligible for point reduction through attending traffic school* * This allows less violations before GDL penalties. All new drivers (~ age 16.5 - 17.5) already have to attend GDL driving class.					
6. Include a GDL provision to restrict the number of passengers for new teen drivers during their first six months of independent driving. Family members would not be included in the restriction.					
7. Include a penalty* with a high impact on the teen driver that does not involve the court system *Such as requiring a clean driving record for a period of time before being allowed to progress to the next GDL license level or to full licensure					
8. Include provisions that clearly allow alternatives* to suspensions and fines and have a higher impact on teens and less impact on parents, courts and insurance agencies *Penalties such as locally scheduled classes, community service and restricted hours of operation					
9. Restrict unsupervised Nighttime driving (after 10 or 11pm) for teens during the first six months of independent driving, except for work, school, church, etc.					
10. Provide education* to the law enforcement officers, judges and prosecutors implementing GDL. *This includes providing clear information on GDL purpose and provisions, their specific role in enforcement of the provisions, ideas on effective ways to enforce the provisions, and statistical results of their efforts.					

11. Conduct a media campaign to encourage parents to enforce provisions such as the "Nighttime Driving Restriction" and "Adult Supervisor/escort Requirement" for permit drivers						
12. Provide increased teen education on driving safety						
13. Conduct a media campaign focusing on the first 6-months of independent teen driving, to inform parents about the need for close monitoring, skills training, and need for limit on passengers and driving privileges.						
14. Regularly disseminate local and statewide teen MVC statistics* *showing the severity of the teen crash problem and the progress towards reducing teen MVCs to-help encourage enforcement, compliance and support for the GDL program at all levels						
15. Make driver's licenses for those under age 21 more difficult to alter* to help decrease purchase of alcohol by minors using altered identification						

Many concerns regarding enforcement of GDL provisions were expressed by law enforcement officers and judicial participants in our interviews. Please check appropriate box

Comment	I agree	I disagree
It is hard to enforce the GDL nighttime driving restriction for permit drivers		
Many people do not know about the GDL nighttime driving restriction for permit drivers		
A suspicion of violation of the nighttime driving restriction does not constitute "probable cause" for stopping a vehicle		
If a person was initially stopped for suspicion of a permit license violation (such as nighttime driving restriction or not having an adult escort), but turned out to have a license, any subsequent charges made during that stop might have to be dismissed in court		
The penalty of license suspension on teen drivers can result in persons being seen back in court for driving without a license and driving with no insurance		
Our area prefers to avoid imposing the penalty of license suspension and prefers to quickly reinstate suspended licenses (not including alcohol cases)		
The teen's parent/guardian may not know of the teen driver's traffic violations		
The teen's parent/guardian is not required to accompany the teen in court for a traffic violation		

Do you work in an area that has an existing night time curfew? (not related to GDL)

- Yes No

TABLE C-1. RESULTS FROM LAW ENFORCEMENT OFFICER AND JUDICIAL OPINION SURVEYS:
RESPONSES

COMMENTS	GROUP	RESPONSES (PERCENT)	
		"I AGREE"	"I DISAGREE"
1. Many people do not seem to know about the GDL nighttime driving restriction for permit drivers.	State Troopers	92	7
	Police/ Sheriff	93	5.7
	Judges	90	7
2. It is hard (for officers) to enforce the GDL nighttime driving restriction for permit drivers	State Troopers	72	27
	Police/ Sheriff	73	24
	Judges	73	20
3. A suspicion of violation of the nighttime driving restriction does not necessarily constitute "probable cause" for stopping a vehicle.	State Troopers	66	33
	Police/ Sheriff	58	39
	Judges	54	41
4. If a person was stopped for suspicion of a permit violation (such as a nighttime driving), but proved to have a regular license, any subsequent charges made during that stop might have to be dismissed in court	State Troopers	54	45
	Police/ Sheriff	47	52
	Judges	49	49
5. In many cases, the teen's parent/guardian may not know of the teen driver's traffic violations	State Troopers	91	8
	Police/ Sheriff	91	8
	Judges	80	17
6. The teen's parent/guardian is usually not required to accompany the teen in court for a traffic violation	State Troopers	86	13
	Police/ Sheriff	78	20
	Judges	85	12
7. The penalty of license suspension on teen drivers can result in persons being seen back in court for driving without a license and driving with no insurance	State Troopers	82	15
	Police/ Sheriff	83	13
	Judges	88	5

TABLE C-2. RESULTS FROM LAW ENFORCEMENT OFFICER AND JUDICIAL OPINION SURVEYS:
RECOMMENDATIONS

RECOMMENDATION	SURVEY GROUP	RESPONSES (PERCENT)			
		Percent Total Support* (Strong Support)	"Probably would not help"	"Might cause worse problems"	
1. KY DUI LAW: Include a GDL provision to allow stronger penalties for teen drivers repeatedly convicted of DUI violations (.02 BAC law)	State Troopers	96 (78)	0.7	0.2	
	Police/ Sheriff	96 (82)	2	0	
	Judges	93 (76)	0	0	
2. KY DUI LAW: Allow a teen's record of previous DUI violations to be accessible to the courts (BAC 0.02 to 0.08 ml/dl) --[allows identification of repeat offenders]	State Troopers	97 (78)	0.7	0.7	
	Police/ Sheriff	94 (81)	1	0.7	
	Judges	88 (61)	2	5	
3. Make driver licenses for those under age 21 more difficult to alter/fabricate to help decrease purchase of alcohol by minors using altered identification	State Troopers	91 (66)	4	0	
	Police/ Sheriff	94 (79)	3	0	
	Judges	78 (63)	10	0	
4. Require licensing agency to notify parents/ guardians of teen's traffic violations.	State Troopers	91 (67)	5	0.7	
	Police/ Sheriff	95 (76)	3	0.4	
	Judges	93 (61)	7	0	
5. Provide increased teen EDUCATION on driving safety.	State Troopers	90 (56)	7	0	
	Police/ Sheriff	93 (58)	4	0	
	Judges	85 (44)	7	0	
6. Provide EDUCATION to the law enforcement officers, judges and prosecutors implementing GDL. This includes providing clear information on GDL purpose and provisions, their specific role in enforcement of the provisions, ideas on effective ways to enforce the provisions, and statistical results of their efforts.	State Troopers	82 (46)	8	0.2	
	Police/ Sheriff	91 (63)	2	0	
	Judges	83 (44)	7	0	
7. Allow courts to require the presence of parents (guardians) when teens are in court for traffic violations	State Troopers	90 (60)	5	1.2	
	Police/ Sheriff	93 (68)	4	1	
	Judges	80 (51)	12	2	
8. Include a penalty with a high impact on the teen driver that does not involve the court system, such as requiring a clean driving record for a period of time before being allowed to progress to the next GDL license level or to full licensure	Judges	78 (22)	10	2	
9. Include provisions that clearly allow alternatives to suspensions and fines that have a higher impact on teens and less impact on parents, courts and insurance agencies (classes, community service and restricted hours of operation)	Judges	76 (27)	15	7	

RECOMMENDATION	SURVEY GROUP	RESPONSE IN PERCENT		
		Total Support* (Strong Support)	"Probably would not help"	"Might cause worse problems"
10. Regularly disseminate local and statewide teen crash statistics	State Troopers	80 (37)	14	0
	Police/ Sheriff	87 (47)	5	0.7
	Judges	71 (37)	15	0
11. Conduct a MEDIA campaign to encourage parents to enforce provisions such as the "nighttime driving restriction" and "adult supervisor/escort requirement" for permit drivers	State Troopers	78 (37)	15	0.5
	Police/ Sheriff	85 (43)	8	0.4
	Judges	63 (29)	27	0
12. Conduct a MEDIA campaign focusing on the first 6-months of independent teen driving, to inform parents about the need for close monitoring, skills training, and need for limit on passengers and driving privileges.	State Troopers	78 (38)	15	0
	Police/ Sheriff	85 (48)	6	1
	Judges	66 (34)	27	0
13. Require vehicles driven by new teen drivers to display a sign or decal identifying them as a novice or permit driver under GDL provisions and restrictions.	State Troopers (283 asked)	45 (17)	22	6
	Police/ Sheriff	61 (44)	12	12
14. Include a GDL provision to restrict the number of passengers for new teen drivers during their first six months of independent driving (family members would not be included in the restriction).	State Troopers	82 (48)	10	0.5
	Police/ Sheriff	88 (64)	9	0
	Judges	68 (22)	24	2
15. Restrict unsupervised nighttime driving (after 10 or 11pm) for teens during the first six months of independent driving, except for work, school, church, etc.).	State Troopers	81 (49)	11	1.2
	Police/ Sheriff	91 (64)	5	0.4
	Judges	63 (37)	27	5
16. Make drivers under age 18 ineligible for point reduction though attending traffic school. This allows less violations before GDL penalties. All new drivers (~age 16.5-17.5) already have to attend GDL driving class.	Judges	20 (12)	46	29

*Note: "Support" is defined as responses of "Definitely would be an improvement", "Would be an improvement", "Might/should be an improvement" to Kentucky's Graduated Driver Licensing Program. "Strong Support" is defined as responses of "Definitely would be an improvement", or "Would be an improvement". Responses of "I prefer not to comment" and "No opinion" are not included in table.

Appendix D
Crash and Licensing Tables

TABLE D-1. NUMBER OF DRIVERS IN AGE GROUP INVOLVED IN CRASHES PER 1,000 DRIVERS

AGE	1994	1995	1996	1997	1998	1999	2000	AVERAGE 1994-1995	AVERAGE 1997-2000	PERCENT CHANGE
16	167	191	178	131	112	124	138	179	126	-29.6
17	185	202	197	199	206	205	213	193	206	+6.3
18	176	185	180	181	173	199	195	180	187	+3.6
19	154	164	166	173	154	166	173	159	167	+4.7
16-19	170	185	182	173	163	176	181	177	173	-2.3
Over 19	73	74	78	78	71	73	76	74	75	+1.4

TABLE D-2. NUMBER OF DRIVERS BY AGE FOR DATES PROVIDED

DATE	DRIVER AGE (YEARS)							
	16 WITH PERMIT	16 WITH LICENSE	16	17	18	19	20	21
6/00	22,585	11,962	34,547	41,909	47,540	49,731	51,360	48,061
12/99	22,780	11,712	35,492	42,320	47,041	50,295	50,458	46,842
12/98	24,129	11,467	35,596	41,590	48,192	49,574	49,076	47,826
12/97	23,506	10,877	34,392	42,843	47,927	48,204	49,770	45,053
6/97	22,878	12,561	35,451	42,969	47,286	48,105	48,995	44,515
12/96	14,865	21,045	35,929	41,991	45,880	48,420	46,542	44,613
6/96	14,766	23,765	38,545	41,407	48,757	48,349	46,360	45,389
6/95	13,004	21,634	34,661	40,663	46,900	45,718	47,595	43,827
6/94	13,621	23,692	37,343	41,912	44,713	47,378	45,927	45,994

TABLE D-3. NUMBER OF DRIVERS INVOLVED IN TRAFFIC CRASHES (BY DRIVER AGE AND GENDER): 1993-1995 AVERAGE COMPARED TO 1997-1999 AVERAGE

	AGE 16		AGE 17		AGE 18		AGE 19		21 OR OLDER	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1993-1995 Average	3,727	2,762	4,656	3,261	5,095	3,178	4,661	2,892	103,351	70,188
1997-1999 Average	2,351	1,997	4,824	3,768	5,202	3,576	4,790	3,289	104,314	74,465
Percent Change	-36.9	-27.7	+3.6	+15.5	+2.1	+12.5	+2.8	+13.7	+0.9	+6.1

TABLE D-4. CRASHES PER 1,000,000 MILES DRIVEN

CATEGORY	1998	1999	2000
Age 16 with permit	6.4	7.3	7.4
Age 16 with license	20.5	22.6	23.3
Age 17	16.8	16.8	17.4
Over 19	5.7	5.9	6.1

TABLE D-5. NUMBER OF DRIVERS INVOLVED IN TRAFFIC CRASHES BEFORE AND AFTER KENTUCKY'S GDL PROGRAM, BY HIGHWAY DISTRICT AND AGE

KENTUCKY HIGHWAY DISTRICT	AGE GROUP	AVERAGE NUMBER OF DRIVERS INVOLVED IN CRASHES PER YEAR		REDUCTION WITH GDL* (PERCENT)
		BEFORE GDL (1993-1995)	AFTER GDL (1997-1999)	
District 1	16	468	301	-35.7
Counties: Ballard, Calloway,	17	510	510	0.0
Carlisle, Crittenden, Fulton,	18	454	465	2.4
Graves, Hickman, Livingston,	19	409	422	3.2
Lyon, McCracken, Marshall,	Over 19	9,402	9,220	- 1.9
Trigg				
District 2	16	778	518	-33.5
Counties: Caldwell,	17	820	924	12.7
Christian, Daviess, Hancock,	18	844	886	5.0
Union, Webster, Henderson,	19	699	758	8.4
Hopkins, McLean,	Over 19	16,657	16,647	-0.0
Muhlenberg, Ohio				
District 3	16	472	330	-30.0
Counties: Allen, Barren,	17	545	625	14.7
Butler Edmonson, Logan,	18	567	616	8.6
Metcalf Monroe, Simpson,	19	541	564	4.3
Todd Warren	Over 19	10,822	11,422	5.5
District 4	16	492	314	-36.1
Counties: Breckinridge,	17	573	637	11.2
Grayson, Green, Hardin, Hart,	18	537	589	9.7
Larue, Marion, Meade,	19	485	496	2.3
Nelson, Taylor, Washington	Over 19	10,104	10,178	0.7
District 5	16	1,439	921	-36.0
Counties: Bullitt, Franklin,	17	1,898	1,864	-1.8
Henry, Jefferson, Oldham,	18	1,990	1,911	-4.0
Shelby, Spencer, Trimble	19	1,848	1,810	-2.1
	Over 19	51,003	50,163	-1.6

*Percent change after GDL (1997 through 1999) from before GDL (1993 through 1995).

TABLE D-5. NUMBER OF DRIVERS INVOLVED IN TRAFFIC CRASHES BEFORE AND AFTER KENTUCKY'S GDL PROGRAM , BY HIGHWAY DISTRICT AND AGE

KENTUCKY HIGHWAY DISTRICT	AGE GROUP	AVERAGE NUMBER OF DRIVERS INVOLVED IN CRASHES PER YEAR		REDUCTION WITH GDL* (PERCENT)
		BEFORE GDL (1993-1995)	AFTER GDL (1997-1999)	
District 6 Counties: Boone, Bracken, Campbell, Carroll, Gallatin, Grant, Harrison, Kenton, Owen, Pendleton, Robertson	16	780	559	-28.3
	17	876	1,063	21.3
	18	880	1,036	17.7
	19	756	876	15.9
	Over 19	19,238	19,926	3.6
District 7 Counties: Anderson, Bourbon, Boyle, Clark, Fayette, Garrard, Jessimine, Madison, Mercer, Mont- gomery, Scott, Woodford	16	865	596	-31.0
	17	1,098	1,256	14.4
	18	1,269	1,466	15.5
	19	1,272	1,495	17.5
	Over 19	30,263	36,635	21.1
District 8 Counties: Adair, Casey, Clinton, Cumberland, Lincoln, McCreary, Pulaski, Rockcastle, Russell Wayne	16	247	176	-28.7
	17	316	353	11.7
	18	300	348	16
	19	281	314	11.7
	Over 19	6,094	6,386	4.8
District 9 Counties: Bath, Boyd, Carter, Elliot, Fleming, Greenup, Lewis, Mason, Nicolas, Rowan	16	309	218	-29.4
	17	375	443	18.1
	18	410	453	10.5
	19	364	413	13.5
	Over 19	7,800	8,322	6.7
District 10 Counties: Breathitt, Estill, Lee, Magoffin, Menifee, Morgan, Owsley, Perry, Powell, Wolfe	16	153	86	-44
	17	209	217	3.8
	18	239	239	0
	19	196	226	15.3
	Over 19	3,966	4,260	7.4
District 11 Counties: Bell, Clay, Harlan, Jackson, Knox, Laurel, Leslie, Whitley	16	247	174	-29.6
	17	345	376	9.0
	18	396	412	4.0
	19	338	377	11.5
	Over 19	7,542	7,725	2.4
District 12 Counties: Floyd, Johnson, Knott, Lawrence, Letcher, Martin, Pike	16	242	158	-34.7
	17	354	329	-7.0
	18	392	351	-10.4
	19	360	333	-7.5
	Over 19	7,485	7,071	-5.5

*Percent change after GDL (1997 through 1999) from before GDL (1993 through 1995).

Appendix E
Crash Cost Tables

TABLE E-1. COMPARISON OF CRASH COSTS BY YEAR FOR 16 YEAR OLD DRIVERS AND FOR ALL OCCUPANTS OF CARS WITH 16 YEAR OLDER DRIVERS USING 1997 ECONOMICS

YEAR	COSTS FOR 16 YEAR-OLD DRIVERS ONLY			COSTS FOR 16 YEAR -OLD DRIVER PLUS ALL OCCUPANTS		
	1992 CRASH COST	1994 NHSTA	1994 COMPREHENSIVE	1992 CRASH COST	1994 NHSTA	1994 COMPREHENSIVE
1993	\$ 41,966,857	\$43,928,398	\$115,747,796	\$87,677,028	\$92,890,608	\$273,580,506
1994	37,838,110	39,624,947	104,106,857	81,793,668	86,670,350	255,039,003
1995	44,984,946	47,170,096	127,973,130	105,279,043	111,654,405	339,789,840
1996	41,869,847	43,801,100	113,786,669	87,918,245	93,113,924	271,465,089
1997	26,147,449	27,302,401	68,069,594	64,081,922	67,829,452	199,936,783
1998	23,852,549	24,960,406	64,458,279	52,141,081	55,210,646	161,307,074
1999	26,174,683	27,414,407	70,827,151	62,020,678	65,697,622	194,786,351
2000	29,301,702	30,626,623	79,251,362	54,024,428	57,248,746	170,079,841

TABLE E-2. COMPARISON OF CRASH COSTS BY YEAR FOR 17 YEAR-OLD DRIVERS AND FOR ALL OCCUPANTS OF CARS WITH 17 YEAR OLDER DRIVERS USING 1997 ECONOMICS

YEAR	COSTS FOR 17 YEAR-OLD DRIVERS ONLY			COSTS FOR 17 YEAR DRIVER PLUS ALL OCCUPANTS		
	1992 CRASH COST	1994 NHSTA	1994 COMPREHENSIVE	1992 CRASH COST	1994 NHSTA	1994 COMPREHENSIVE
1993	\$48,797,671	51,030,799	\$132,405,160	\$99,187,125	\$105,086,552	\$320,264,724
1994	49,428,967	51,730,580	203,744,837	100,998,061	106,977,256	312,981,572
1995	49,172,938	51,466,632	133,472,199	107,125,757	113,512,991	334,356,669
1996	53,631,315	56,120,083	148,214,324	113,766,299	120,423,652	356,467,743
1997	55,090,915	57,660,409	151,947,848	115,277,503	122,057,599	360,544,803
1998	57,860,846	60,594,291	162,012,630	120,451,610	127,538,058	379,251,008
1999	55,039,638	57,579,803	150,766,385	116,734,140	123,561,640	364,975,653
2000	56,696,336	59,249,965	153,945,710	113,595,618	120,191,388	349,357,844

