REPORT TO THE TWENTY THIRD LEGISLATURE

OF

THE STATE OF HAWAII

REGULAR SESSION OF 2006

ON

ACT 72
SESSION LAWS OF HAWAII 2005
SECTION 12

SUBJECT: **A PROGRESS REPORT: "PLAN FOR THE EVALUATION OF HAWAII'S GRADUATED LICENSING PROGRAM"**

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
DECEMBER 2005

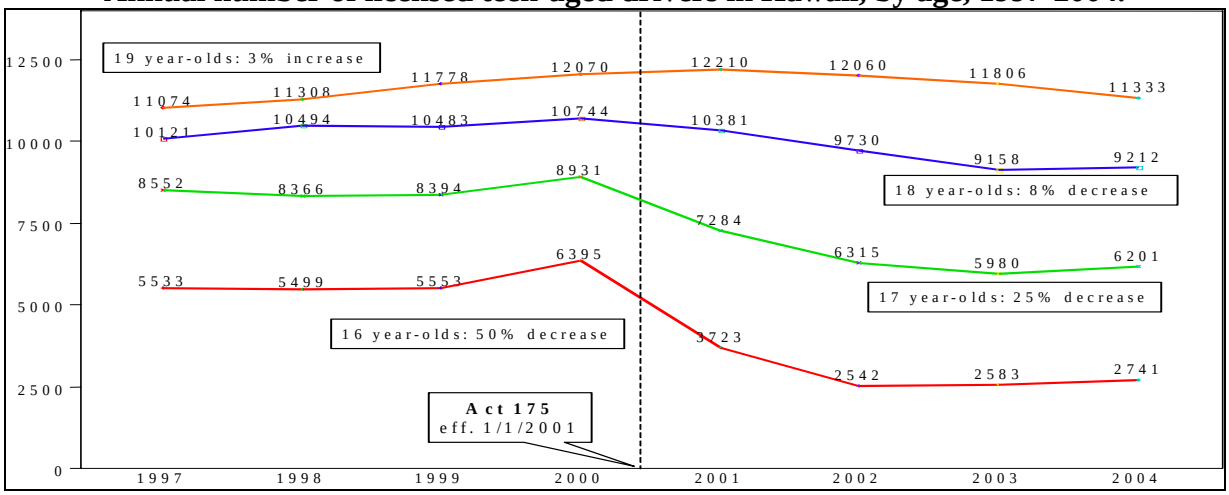
Introduction: Hawaii's graduated licensing (GDL) program, as stipulated by Act 72, will go into effect on January 9, 2006. In short, GDL will place new restrictions for 16 and 17 year-old drivers on the unsupervised late-night driving and the number of passengers allowed during unsupervised driving. Act 72 further requires the Hawaii Department of Transportation (DOT) and Department of Health (DOH) to evaluate the effectiveness of GDL in terms of reducing crashes involving teen drivers and resultant injuries. Since GDL is not in effect until early 2006, this report will outline the general evaluation strategy; baseline data is still being assembled.

Methodology: The evaluation of GDL in Hawaii will take 3 basic analytic forms:

1. Examination of annual trends in the **number** of teen drivers involved in crashes.
2. Examination of annual trends in the **proportion** of crashes involving teen drivers.
   Definition 1: (Number of teen drivers involved / Total number of drivers) *100.
   Definition 2: (Number crashes with teen drivers / Total number of crashes) *100.
3. Examination of annual trends in the **rate** of teen driver involvement in crashes.
   Definition: (Number of teen drivers involved / Number of licensed teen drivers) *factor.

Trends in the number of teen drivers will describe the absolute involvement of teen drivers in crashes in Hawaii, while the other 2 approaches (proportion and rate) will describe relative involvement. Trends in proportion (e.g. teen drivers were involved in x% of crashes during year x, and y% during year y.) will describe the teen driver contribution relative to overall numbers of crashes, which can increase or decrease over time. Trends in rate will help to interpret changes in the number of teen drivers involved in crashes in Hawaii. A decrease in the number of teen drivers could either reflect better skill among teen drivers during GDL enforcement, or may simply be the result of fewer teen drivers on the road. A reduction in the number of teen drivers involved in crashes, in the absence of changes in the rate, would support the latter scenario. In other words, GDL may work by keeping teen drivers off the road, but not by making them better drivers. The figure below shows the dramatic decrease in the number of licenses among 16 and 17 year-olds in association with the enactment of Act 175 in 2001, which required driver education and driver training for applicants under age 18.

Annual number of licensed teen-aged drivers in Hawaii, by age, 1997-2004.



Each of the 3 main analytic outcomes described above (number, proportion and rate of crashes) will be considered using at least 3 different classifications of crashes:
1. All crashes involving teen drivers.
2. Crashes involving teen drivers between 11:00 p.m and 5:00 a.m.
3. Crashes involving teen drivers with more than one passenger under age 18.

GDL is specifically designed to prevent the latter two types of crashes. Although there are permissible exemptions to those two stipulations under GDL, violations will be indicated by citations in the police crash reports. Other analyses will consider crashes in which teen drivers are "at fault" as indicated by police reports, and single vehicle crashes involving teen drivers. Fatal and non-fatal crashes will be combined for the analysis of annual trends. It is not possible to analyze annual trends in only fatal crashes involving 16 and 17 year-old drivers, since there are too few of them for reliable statistical estimates. (An average of 5 drivers per year over the 2001 to 2004 period). Although the primary purpose of this evaluation is to describe changes in the crash patterns of teen drivers, it is also important to monitor crash patterns of drivers of all ages over the same time periods. This will help to account for underlying secular trends in traffic safety generally, and help clarify the specific effects of the GDL.

In addition to the crash-based outcomes described so far, the annual number of fatal and non-fatal injuries will also be monitored in a pre- and post-GDL manner. At a minimum, this will take the form of the injury severity assessment completed by police at the crash scene: no injury, possible injury, non-incapacitating injury, incapacitating injury, and fatal injury. More detailed injury outcome information will be available from DOH data sources, including death certificates for fatal injuries, and hospitalization, emergency department (ED), and EMS records for both fatal and non-fatal crashes.

The latter sources of information (hospitalization, ED, and EMS records) all have limitations, however. Crash related injuries can only be identified in hospitalization and ED records through the use of external cause of injury codes ("E-codes"). E-codes differentiate, for example, a broken leg caused from a fall from one caused by a car crash. Since E-codes are not mandated in Hawaii, however, they are not present in all records. Also, the presence of E-codes has been changing over time and by county, which further limits the ability to track trends in hospitalization and ED records. The table below shows the generally increasing proportion of hospitalization and ED records with E-codes, going back to 2000. The proportion of E-coded records has been over 90% in Neighbor Island hospitals since 2003 (2000 for ED records); records from Oahu hospitals have less injury documentation.

Percent of injury-related ED and hospitalization records with E-codes, by county and year.

	Year				
Type of record	2000	2001	2002	2003	2004
ED records					
Oahu	33.5	45.5	60.7	75.3	71.6
Neighbor Islands	91.6	91.9	92.6	94.5	95.9
Hospitalization records					

Oahu	40.7	40.5	54.5	84.1	82.9
Neighbor Islands	82.2	80.9	83.3	93.4	94.7

EMS records are an alternative to hospitalization and ED data, but this source is also limited in that not all crashes are attended by EMS. Another consideration is that the EMS data collection system is currently being revamped to a web-based electronic system. The new system is expected to be implemented for Oahu EMS early 2006, with Neighbor Island systems changed over in following years. If the implementation progresses as expected then timely, detailed information will be available only for 2006 onwards for Oahu, and later for EMS on the Neighbor Islands.

All analyses will be conducted both on a statewide and county-specific basis. Results will be stratified by single year of age for teen drivers (ages 16 through 19 years), age groupings for older drivers, and by driver gender. Since Act 72 goes into effect in January of next year, 2006 will denote the start of the post-GDL period. The baseline, or pre-GDL period will extend back to 1997. This will provide adequate time to describe the teen driver experience in terms of secular trends and the consequences of Act 175 in 2001. Trends will be statistically assessed for 2006 and succeeding post-GDL years, compared to pre-GDL time periods. Trends in proportion will be tested for statistical significance using a chi-square test for trend, and trends in rates will be tested with Poisson regression analysis.

Data sources: Data from the Motor Vehicle Accident Report (MVAR) form for all crashes, and the Fatal Analysis Reporting System (FARS) of the National Highway Traffic Safety Administration for fatal crashes from MVAR and FARS will be provided by DOT. Data from death certificates archived at the DOH will be linked to FARS records. Data on non-fatal injuries (hospitalization and ED records) will be furnished by DOH, in agreement with the Hawaii Health Information Corporation. EMS records will also be made available by the DOH. The annual numbers of licensed drivers will be provided by the Department of Information Technology, City and County of Honolulu.

Reporting: The GDL evaluation team will submit annual reports to the Hawaii Legislature describing analytic results, based on the calendar year. The reports will contain a summary section describing the main trends in the number, proportion and rate of crashes involving teen drivers. More detailed findings (e.g. gender- or county-specific findings) will also be included in graphical and tabular form, along with written interpretation. The following table gives an example of the baseline data for this evaluation, and outlines the data to be collected as GDL is implemented in 2006 and beyond. The MVAR, FARS, and death certificate data are expected to be available after a 2-year lag. Therefore, a complete summary of crashes occurring in 2006, for example, will not be available until the start of the 2009 legislative session.

Annual number and rate of crashes in Hawaii, by age of driver, 1997-2005.

Age	Quantity	1997	1998	1999	2000	2001	2002	2003	2004	2005+
16y	# crashes	.	.	.	.	.	.	.	.	
	# licenses	5533	5499	5553	6395	3723	2542	2583	2741	.
	rate	.	.	.	.	.	.	.	.	.
17y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	8552	8366	8394	8931	7284	6315	5980	6201	.
	rate	.	.	.	.	.	.	.	.	.
18y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	10121	10494	10483	10744	10381	9730	9158	9212	.
	rate	.	.	.	.	.	.	.	.	.
19y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	11074	11308	11778	12070	12210	12060	11806	11333	.
	rate	.	.	.	.	.	.	.	.	.
20-24y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	59474	59915	61871	66100	69631	71046	72199	72455	.
	rate	.	.	.	.	.	.	.	.	.
25-29y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	72725	71243	69505	69001	70747	74327	76373	76805	.
	rate	.	.	.	.	.	.	.	.	.
30-34y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	80358	77614	75347	75256	76648	79045	80229	78603	.
	rate	.	.	.	.	.	.	.	.	.
35-39y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	86672	85721	84013	82603	82408	82928	82800	82226	.
	rate	.	.	.	.	.	.	.	.	.
40-44y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	86249	86249	85219	85238	86264	88384	89442	89197	.
	rate	.	.	.	.	.	.	.	.	.
45-49y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	79904	81082	81624	82960	85625	87872	89120	89391	.
	rate	.	.	.	.	.	.	.	.	.
50-54y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	65876	68958	71747	75072	78491	81569	83910	85404	.
	rate	.	.	.	.	.	.	.	.	.
55-64y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	79788	84753	89741	94036	101920	111727	120090	127814	.
	rate	.	.	.	.	.	.	.	.	.
65-74y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	60871	61239	61527	62563	64079	66109	66946	67747	.
	rate	.	.	.	.	.	.	.	.	.
75+y	# crashes	.	.	.	.	.	.	.	.	.
	# licenses	30163	32332	34370	35856	38409	41014	43552	44747	.
	rate	.	.	.	.	.	.	.	.	.