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PURSUANT TO ACT 72
SESSION LAWS OF HAWAII 2005
SECTION 12

PROGRESS REPORT: "PLAN OR THE EVALUATION OF HAWAII'S
GRADUATED LICENSING PROGRAM"

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII
DECEMBER 2006

2006 Report for the Evaluation of Act 72: Hawaii's Graduated Licensing Program

Executive Summary:

This report is based on traffic and injury data from the 2001-2005 period, and therefore provides a "baseline" description of traffic crashes involving 16 and 17 year-old drivers. Since Act 72 was implemented in January of 2006, subsequent reports will more directly examine its effects on traffic crashes involving teen drivers and their effects. The data for the present report was incomplete in some aspects and the following results should therefore be considered preliminary in nature.

Introduction:

Hawaii's graduated licensing (GDL) program, as stipulated by Act 72, went into effect on January 9, 2006. In short, GDL placed new restrictions for 16 and 17 year-old drivers on the unsupervised late-night driving and the number of passengers under age 18 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 the data required for this evaluation are not available until at least a one year lag, the present report will describe only "baseline" conditions from 2001-2005.

Methods:

A 2005 report to the Legislature provided details on the evaluation plan for Act 72. Briefly, this report relies primarily on data from the Motor Vehicle Accident Report (MVAR) form completed by police for all crashes in the state. MVAR data from all counties is forwarded to the DOT after a lag period of approximately one year. MVAR data was used to examine annual trends in 3 outcomes:

1. Annual trends in the **number** of teen drivers involved in crashes.
2. Examination of annual trends in the **rate** of teen driver involvement in crashes.
Definition: (Number of teen drivers involved / 1,000 licensed teen drivers).
3. Annual trends in the **proportion** of crashes involving teen drivers.
Definition: (Number of teen drivers involved / Total number of drivers in crashes) *100.

Trends in the number of teen drivers describe the absolute involvement of teen drivers in crashes in Hawaii, while the other 2 approaches (rate and proportion) describe relative involvement. Drivers were identified through the "position" field in MVAR, which was missing for 6.4% of the records. Of the resulting 137,685 drivers identified, 11,050 (8.0%) were deleted either because data for age was missing (10,278, or 7.5%), or the driver was under age 16 (772, or 0.6%). The annual numbers of licensed drivers was provided by the Department of Information Technology, City and County of Honolulu.

MVAR data were also used to examine trends in crashes involving 16 and 17 year-old drivers which occurred between 11:00pm and 5:00am, as driving during these times is restricted by Act 72. Trends were also assessed on crashes involving 16 and 17 year-old drivers who had more than 1 passenger under the age of 18 years, without being accompanied by the driver's

parent or guardian. MVAR data cannot distinguish parents and guardians, so a proxy indicator was devised: any passenger at least 30 years of age.

At the time this report was compiled, MVAR data was complete through calendar year 2005 with the following exceptions:

- a portion of December, 2005 for Oahu,
- a portion of March through May, 2004 for Hawaii County,
- all of October through December, 2005 for Hawaii County,
- a portion of December, 2005 for Maui County.

Given these significant gaps in data, the present report only contains analyses at the state level. Subsequent reports based on a full complement of data, will examine outcomes for the state as a whole and within each of the 4 counties.

Other analyses examine the resulting injuries both fatal (using data from the Fatal Analysis Reporting System (FARS) of the National Highway Traffic Safety Administration) and non-fatal injuries from traffic crashes (hospital discharge and emergency department records). The hospital data is limited in that not all records contain the external cause of injury codes ("E-codes) necessary to distinguish traffic crashes. Therefore both actual and estimated injury counts are presented, the latter to correct for incomplete E-coding. Data on non-fatal injuries (hospitalization and ED records) was furnished by DOH, in agreement with the Hawaii Health Information Corporation. Hospital data was available only for the 2003-2005 period.

Results:

Statistically significant decreases were observed in the 5-year crash rates for drivers of all age groups listed in Table 1a. The rate decreased an estimated 28.7% for drivers of all ages over the 5 years. This decreasing trend was consistent across most of the age ranges, with 30% to 36% reductions for ages 30 and older. Rates decreased by 34.4% for 16 year-olds and 29.3% for 17 year-olds. Lower decreases were seen for 18, 19, and 20-29 year-old drivers (16.1%, 17% and 20%, respectively).

In all of the teen-aged groups there was an increase in the crash rate in 2003, followed by decreases in the following 2 years. These patterns are shown graphically in Figure 1. While the reasons for the increase in 2003 are unclear, similar patterns were not evident for drivers over 30 years of age, suggesting the increase was not an artifact of data collection for that year.

Figure 1 also shows the strong inverse association between driver age and crash rates. Rates are successively lower moving across single years of age through the teen years, and continue to decrease less dramatically until about 75 years of age. Rates among 16 year-olds are about 40% greater than rates among 19 year-olds, and about 5 times as high as rates among 30 to 74 year-old drivers.

The decreasing trends were generally stronger among the male teen-aged drivers (Table 1b), compared to the female teen-aged drivers (Table 1c). Trends decreased significantly among male teenagers for each year of age except for 18 year-olds, but only among the 17 year-old

females. An opposite pattern was seen for older drivers: decreases were greater for female drivers aged 30 to 74 years of age, compared to male drivers.

There were also significant, decreasing trends in the proportion of drivers in crashes that were 16 or 17 years of age. Sixteen year-olds comprised roughly 2% of all drivers involved in crashes in 2001, but only 1.5% by 2005, while 17 year-olds comprised 2.8% of drivers in 2001 and 2.2% in 2005 (Figure 2). As per crash rates, these trends in proportion were somewhat stronger among the male teen-aged drivers compared to the females. Significantly increasing trends were observed in the proportion of drivers who were 20 to 29 years of age, particularly among the females.

There was a total of 424 drivers aged 16 or 17 who were involved in night time crashes from 2001-2005 (Table 2). The annual number decreased each year with the exception of 2003. Most of the drivers (73%) were males. The rate of night time crashes involving 16 or 17 year-old drivers generally decreased over the 5-year period, with the exception of an increase among 16 year-olds in 2003. The trends were strongest among male drivers although none of the trends were statistically significant. Also, the strength of the trends was largely dependent on 2005, which is limited by the incomplete reporting from that year (see above). There were also no significant trends in the proportion of 16 and 17 year-olds among drivers involved in night time crashes.

There were also no significant trends in the rates of teen drivers who crashed with more than one passenger under the age of 18, and no other passenger over the age of 30 (Table 3). There were fairly consistent decreases in the rates with the exception of the unexplained increase in 2003. Most (65%) of these 364 drivers were males.

With the exception of 2004, there were 2 to 4 drivers per year who were 16 or 17 years old who were involved in fatal crashes (Table 4). A total of 25 people were killed in the 21 separate crashes that involved 16 or 17 year-old drivers over the 5-year period. There was no clear trend in the annual number of victims, but the numbers may be too small for meaningful analysis. There was an increasing trend (2003-2005) for 16 year-olds in the number of non-fatal injuries treated in emergency departments or requiring hospitalizations, but this was offset by a decreasing trend among 17 year-olds (Table 5).

Table 1a. Annual number and rate of crashes in Hawaii, both genders, by age of driver.

Age	Outcome	2001	2002	2003	2004	2005
16 y	# drivers in crashes	283	187	225	182	169
	rate/1000 licensed drivers	76.0	73.6	87.1	66.4	50.1
	% of drivers in crashes	2.0	1.4	1.6	1.5	1.5
17 y	# drivers in crashes	395	366	376	299	257
	rate/1000 licensed drivers	54.2	58.0	62.9	48.2	40.1
	% of drivers in crashes	2.8	2.7	2.7	2.4	2.2
18 y	# drivers in crashes	516	431	540	403	382
	rate/1000 licensed drivers	49.7	44.3	59.0	43.7	41.4
	% of drivers in crashes	3.7	3.2	3.9	3.3	3.3
19 y	# drivers in crashes	518	511	558	468	399
	rate/1000 licensed drivers	42.4	42.4	47.3	41.3	35
	% of drivers in crashes	3.7	3.8	4	3.8	3.5
20-29 yrs	# drivers in crashes	3546	3524	3724	3329	3185
	rate/1000 licensed drivers	25.3	24.2	25.1	22.3	21
	% of drivers in crashes	25.3	26.2	26.9	27	27.7
30-39 yrs	# drivers in crashes	2682	2512	2468	2166	2017
	rate/1000 licensed drivers	16.9	15.5	15.1	13.5	12.6
	% of drivers in crashes	19.1	18.7	17.9	17.6	17.5
40-49 yrs	# drivers in crashes	2593	2440	2446	2167	2004
	rate/1000 licensed drivers	15.1	13.8	13.7	12.1	11.3
	% of drivers in crashes	18.5	18.2	17.7	17.6	17.4
50-59 yrs	# drivers in crashes	1768	1757	1787	1685	1588
	rate/1000 licensed drivers	12.7	11.8	11.5	10.5	9.6
	% of drivers in crashes	12.6	13.1	12.9	13.7	13.8
60-74 yrs	# drivers in crashes	1168	1191	1196	1130	1051
	rate/1000 licensed drivers	11.1	10.7	10.3	9.3	8.4
	% of drivers in crashes	8.3	8.9	8.7	9.2	9.1
75+ yrs	# drivers in crashes	541	521	505	497	443
	rate/1000 licensed drivers	14.1	12.7	11.6	11.1	9.6
	% of drivers in crashes	3.9	3.9	3.7	4.0	3.9
all ages	# drivers in crashes	14010	13440	13825	12326	11495
	rate/1000 licensed drivers	17.8	16.5	16.6	14.6	13.4

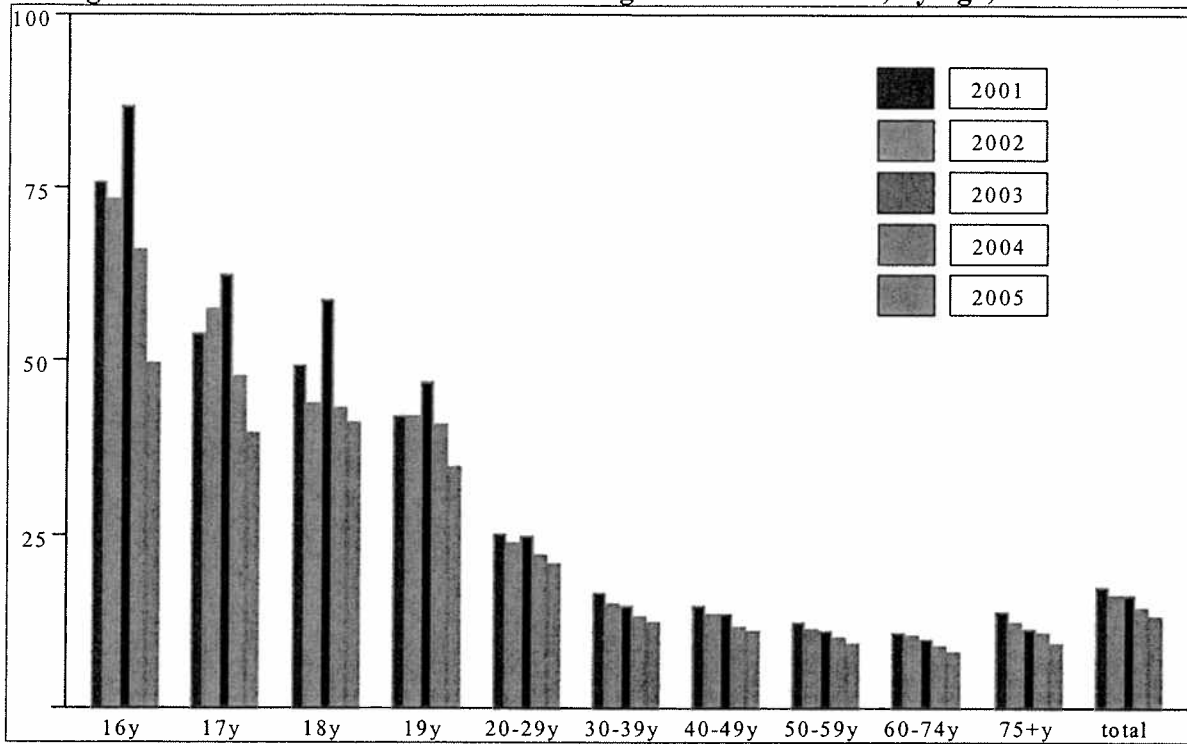
Table 1b. Annual number and rate of crashes in Hawaii, by age of male driver.

Age	Outcome	2001	2002	2003	2004	2005
16 y	# drivers in crashes	184	131	132	109	102
	rate/1000 licensed drivers	93.5	91	93.8	75.3	57.4
	% of drivers in crashes	2.1	1.6	1.5	1.4	1.4
17 y	# drivers in crashes	244	228	236	177	173
	rate/1000 licensed drivers	62.6	66.9	71.9	53.4	51.5
	% of drivers in crashes	2.8	2.7	2.7	2.3	2.4
18 y	# drivers in crashes	318	291	369	257	243
	rate/1000 licensed drivers	56.9	55.4	73.7	50.9	48.8
	% of drivers in crashes	3.7	3.4	4.2	3.3	3.4
19 y	# drivers in crashes	329	336	373	305	259
	rate/1000 licensed drivers	50.5	51.9	58.9	49.8	41.7
	% of drivers in crashes	3.8	4.0	4.2	4.0	3.6
20-29 yrs	# drivers in crashes	2295	2328	2448	2128	2034
	rate/1000 licensed drivers	30.8	30.1	31.0	27.0	25.4
	% of drivers in crashes	26.4	27.6	27.8	27.6	28.1
30-39 yrs	# drivers in crashes	1605	1512	1555	1339	1257
	rate/1000 licensed drivers	19.6	18.1	18.4	16.1	15.2
	% of drivers in crashes	18.4	17.9	17.7	17.4	17.4
40-49 yrs	# drivers in crashes	1551	1482	1485	1326	1262
	rate/1000 licensed drivers	17.5	16.3	16.1	14.4	13.8
	% of drivers in crashes	17.8	17.6	16.9	17.2	17.4
50-59 yrs	# drivers in crashes	1092	1066	1128	1025	1004
	rate/1000 licensed drivers	14.8	13.6	13.8	12.2	11.6
	% of drivers in crashes	12.5	12.6	12.8	13.3	13.9
60-74 yrs	# drivers in crashes	709	741	748	728	645
	rate/1000 licensed drivers	12.6	12.4	12.0	11.2	9.6
	% of drivers in crashes	8.1	8.8	8.5	9.5	8.9
75+ yrs	# drivers in crashes	376	324	319	304	264
	rate/1000 licensed drivers	16.8	13.8	13.0	12.2	10.4
	% of drivers in crashes	4.3	3.8	3.6	3.9	3.6
all ages	# drivers in crashes	8703	8439	8793	7698	7243
	rate/1000 licensed drivers	20.9	19.6	20.0	17.3	16.1

Table 1c. Annual number and rate of crashes in Hawaii, by age of female driver.

Age	Outcome	2001	2002	2003	2004	2005
16 y	# drivers in crashes	99	56	93	73	67
	rate/1000 licensed drivers	56.4	50.8	79.1	56.4	42.0
	% of drivers in crashes	1.9	1.1	1.8	1.6	1.6
17 y	# drivers in crashes	151	138	140	122	84
	rate/1000 licensed drivers	44.6	47.5	51.9	42.2	27.6
	% of drivers in crashes	2.8	2.8	2.8	2.6	2
18 y	# drivers in crashes	198	140	171	146	138
	rate/1000 licensed drivers	41.3	31.3	41.2	35	32.5
	% of drivers in crashes	3.7	2.8	3.4	3.2	3.2
19 y	# drivers in crashes	189	175	185	163	140
	rate/1000 licensed drivers	33.2	31.3	33.8	31.3	27
	% of drivers in crashes	3.6	3.5	3.7	3.5	3.3
20-29 yrs	# drivers in crashes	1251	1195	1275	1201	1151
	rate/1000 licensed drivers	19.0	17.5	18.3	17	16.1
	% of drivers in crashes	23.6	23.9	25.3	26	27.1
30-39 yrs	# drivers in crashes	1077	999	913	824	759
	rate/1000 licensed drivers	14	12.7	11.6	10.6	9.8
	% of drivers in crashes	20.3	20	18.1	17.8	17.9
40-49 yrs	# drivers in crashes	1041	958	961	841	742
	rate/1000 licensed drivers	12.5	11.2	11.2	9.7	8.6
	% of drivers in crashes	19.6	19.2	19.1	18.2	17.5
50-59 yrs	# drivers in crashes	676	691	659	660	584
	rate/1000 licensed drivers	10.3	9.9	9	8.7	7.4
	% of drivers in crashes	12.7	13.8	13.1	14.3	13.7
60-74 yrs	# drivers in crashes	459	449	448	402	406
	rate/1000 licensed drivers	9.4	8.7	8.3	7.2	7.0
	% of drivers in crashes	8.7	9	8.9	8.7	9.6
75+ yrs	# drivers in crashes	165	197	186	193	179
	rate/1000 licensed drivers	10.3	11.3	9.8	9.8	8.7
	% of drivers in crashes	3.1	3.9	3.7	4.2	4.2
all ages	# drivers in crashes	5306	4998	5031	4625	4250
	rate/1000 licensed drivers	14.3	13.0	12.8	11.6	10.5

Figure 1. Annual rates* of crashes among drivers in Hawaii, by age, 2001-2005.



*Number of drivers involved in crashes per 1,000 licensed drivers of the same age.

Figure 2. Annual proportion of drivers involved in crashes who are teen-agers.

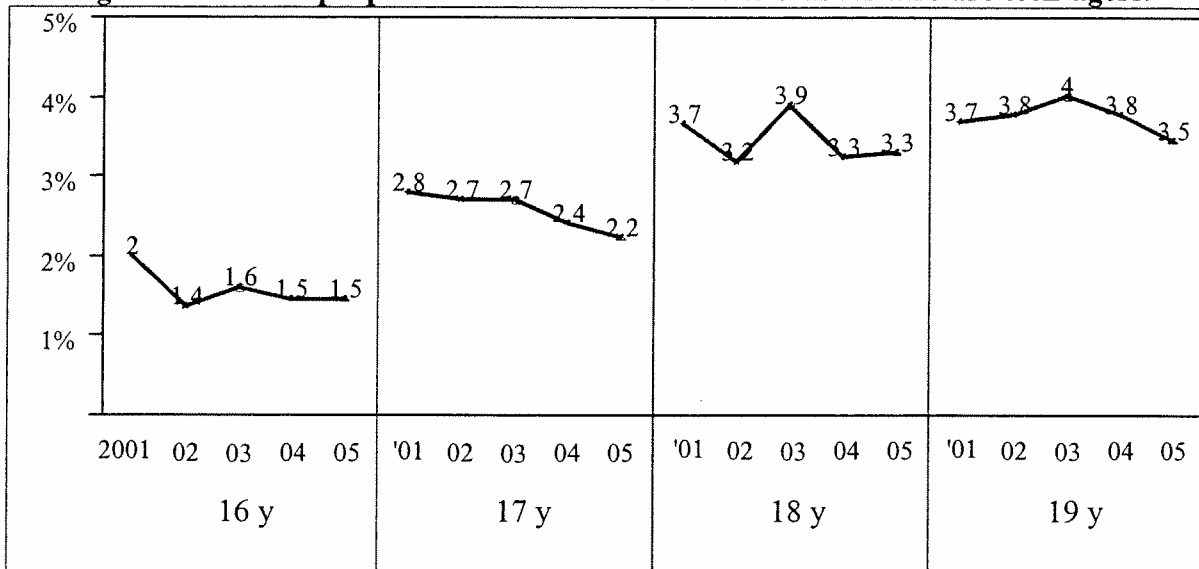


Table 2. Annual number and rate of night time* crashes in Hawaii, by age of driver.

Age	Outcome	2001	2002	2003	2004	2005
both genders						
16 y	# drivers in crashes	43	23	37	26	30
	rate/1000 licensed drivers	11.5	9.0	14.3	9.5	8.9
	% of drivers in crashes*	2.7	1.5	2.1	1.8	2.1
17 y	# drivers in crashes	60	61	53	52	39
	rate/1000 licensed drivers	8.2	9.7	8.9	8.4	6.1
	% of drivers in crashes*	3.8	4.0	3.0	3.6	2.7
16 - 17 y	# drivers in crashes	103	84	90	78	69
	rate/1000 licensed drivers	9.4	9.5	10.5	8.7	7.1
	% of drivers in crashes*	6.5	5.5	5.1	5.4	4.8
males						
16 y	# drivers in crashes	34	18	21	18	21
	rate/1000 licensed drivers	17.3	12.5	14.9	12.4	11.8
	% of drivers in crashes*	2.8	1.5	1.5	1.7	2.0
17 y	# drivers in crashes	46	46	35	37	32
	rate/1000 licensed drivers	11.8	13.5	10.7	11.2	9.5
	% of drivers in crashes*	3.8	3.9	2.6	3.4	3.0
16 - 17 y	# drivers in crashes	80	64	56	55	53
	rate/1000 licensed drivers	13.6	13.2	11.9	11.6	10.3
	% of drivers in crashes*	6.7	5.5	4.1	5.0	5.0
females						
16 y	# drivers in crashes	9	5	16	8	9
	rate/1000 licensed drivers	5.1	4.5	13.6	6.2	5.6
	% of drivers in crashes*	2.4	1.5	3.9	2.2	2.4
17 y	# drivers in crashes	14	15	18	15	7
	rate/1000 licensed drivers	4.1	5.2	6.7	5.2	2.3
	% of drivers in crashes*	3.7	4.4	4.4	4.2	1.9
16 - 17 y	# drivers in crashes	23	20	34	23	16
	rate/1000 licensed drivers	4.5	5.0	8.8	5.5	3.5
	% of drivers in crashes*	6.0	5.9	8.3	6.4	4.2

*Proportion of drivers involved in night time crashes (between 11:01 pm and 4:59 am).

Table 3. Annual number and rate of crashes involving more than one passenger under the age of 18* in Hawaii, by age of driver.

Age	Outcome	2001	2002	2003	2004	2005
both genders						
16 y	# drivers in crashes	44	28	42	25	26
	rate/1000 licensed drivers	11.8	11.0	16.3	9.1	7.7
	% of drivers in crashes	0.3	0.2	0.3	0.2	0.2
17 y	# drivers in crashes	40	47	50	36	26
	rate/1000 licensed drivers	5.5	7.4	8.4	5.8	4.1
	% of drivers in crashes	0.3	0.3	0.4	0.3	0.2
16 - 17 y	# drivers in crashes	84	75	92	61	52
	rate/1000 licensed drivers	7.6	8.5	10.7	6.8	5.3
	% of drivers in crashes	0.6	0.6	0.7	0.5	0.5
males						
16 y	# drivers in crashes	28	24	30	17	15
	rate/1000 licensed drivers	14.2	16.7	21.3	11.7	8.4
	% of drivers in crashes	0.3	0.3	0.3	0.2	0.2
17 y	# drivers in crashes	23	28	30	22	19
	rate/1000 licensed drivers	5.9	8.2	9.1	6.6	5.7
	% of drivers in crashes	0.3	0.3	0.3	0.3	0.3
16 - 17 y	# drivers in crashes	51	52	60	39	34
	rate/1000 licensed drivers	8.7	10.7	12.8	8.2	6.6
	% of drivers in crashes	0.6	0.6	0.7	0.5	0.5
females						
16 y	# drivers in crashes	16	4	12	8	11
	rate/1000 licensed drivers	9.1	3.6	10.2	6.2	6.9
	% of drivers in crashes	0.3	0.1	0.2	0.2	0.3
17 y	# drivers in crashes	17	19	20	14	7
	rate/1000 licensed drivers	5.0	6.5	7.4	4.8	2.3
	% of drivers in crashes	0.3	0.4	0.4	0.3	0.2
16 - 17 y	# drivers in crashes	33	23	32	22	18
	rate/1000 licensed drivers	6.4	5.7	8.3	5.3	3.9
	% of drivers in crashes	0.6	0.5	0.6	0.5	0.4

*Without at least one other passenger over the age of 30 years. (Proxy measure for teen driver's parent or guardian.)

**Table 4. Annual number of fatal car crashes*
involving 16 and 17 year-old drivers in Hawaii, 2001-2005.**

Age	Outcome	2001	2002	2003	2004	2005
drivers involved in fatal car crashes*						
16 y	number of drivers	0	1	1	3	1
	% of all drivers	0.0	0.7	0.7	1.8	0.7
17 y	number of drivers	3	3	3	6	1
	% of all drivers	1.8	2.1	2.1	3.6	0.7
16 - 17 y	number of drivers	3	4	4	9	2
	% of all drivers	1.8	2.8	2.8	5.4	1.4
fatal crashes involving 16 and 17 year-old drivers						
16 y	number of crashes	0	1	1	3	1
	% of total crashes	0.0	1.0	0.9	2.6	0.9
17 y	number of crashes	3	3	3	5	1
	% of total crashes	2.5	2.9	2.8	4.4	0.9
16 - 17 y	number of crashes	3	4	4	8	2
	% of total crashes	2.5	3.8	3.7	7.0	1.8
fatalities involving 16 and 17 year-old drivers						
16 y	number killed	0	1	2	3	1
	% of total fatalities	0.0	0.9	1.6	2.3	0.8
17 y	number killed	3	5	3	6	1
	% of total fatalities	2.3	4.6	2.4	4.7	0.8
16 - 17 y	number killed	3	6	5	9	2
	% of total fatalities	2.3	5.6	3.9	7.0	1.6

*Includes only fatal crashes which involved at least one car. Therefore excludes crashes in which pedestrians were hit by motorcyclists, or crashes in which motorcyclists died in single vehicle crashes.

Table 5. Annual number of non-fatal injuries from traffic crashes among 16 and 17 year-olds in Hawaii, 2003-2005.

Age	Outcome	2001	2002	2003
Emergency department visits				
16 y	number E-coded injuries	169	173	202
	% of E-coded records	94.0	93.3	94.7
	projected # of injuries*	180	185	213
17 y	number E-coded injuries	262	234	233
	% of E-coded records	94.0	93.3	94.7
	projected # of injuries*	279	251	246
16 - 17 y	number E-coded injuries	431	407	435
	% of E-coded records	94.0	93.3	94.7
	projected # of injuries*	459	436	459
Hospitalizations				
16 y	number E-coded injuries	11	16	31
	% of E-coded records	88.8	90.3	92.1
	projected # of injuries*	12	18	34
17 y	number E-coded injuries	41	30	23
	% of E-coded records	88.8	90.3	92.1
	projected # of injuries*	46	33	25
16 - 17 y	number E-coded injuries	52	46	54
	% of E-coded records	88.8	90.3	92.1
	projected # of injuries*	59	51	59
combined total (ED visits + hospitalizations)				
16 y	number E-coded injuries	180	189	233
	% of E-coded records	93.7	93.1	94.5
	projected # of injuries*	192	203	246
17 y	number E-coded injuries	303	264	256
	% of E-coded records	93.7	93.1	94.5
	projected # of injuries*	324	283	271
16 - 17 y	number E-coded injuries	483	453	489
	% of E-coded records	93.7	93.1	94.5
	projected # of injuries*	516	486	517

*Projected to 100% E-coded records (e.g. 16 year-olds treated in emergency departments: 169 coded injuries * 100%/94.0% = 180 projected injuries.)