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Does the Maryland graduated driver licensing law affect both 16-year-old drivers and those who share the road with them?

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Abstract

Problem: To assess effects of the 1999 Maryland graduated driver licensing (GDL) law on both 16-year-old drivers and other road users. *Method:* Calculation and comparison of crash involvement rates and non-fatal injury rates pre-GDL (1996–1998) and post-GDL (2001–2003) by type of road user, per population, and per licensed driver, with adjustment for trends among 30–59-year-old drivers. *Results:* Post-GDL, prevalence of licensure decreased 24% among 16-year-olds, and rates of 16-year-old drivers involved in crashes significantly decreased per 16-year-old population (corrected rate ratio (RRc) 0.82; 95% CI (0.71, 0.96)). A significant decrease also was observed for non-fatal injuries per 16-year-old population among 16-year-old drivers involved in crashes (RRc 0.63; 95% CI (0.41, 0.98)). Similarly, decreases, albeit not statistically significant, were observed among their passengers and other vehicle occupants. Per 16-year-old licensed driver, a slight non-significant increase was observed in crash involvement rates; non-fatal injury rates per 16-year-old licensed driver suggest decreased risk (non-significant) among 16-year-old drivers, their passengers, and other vehicle occupants. *Summary:* Maryland's GDL delayed licensure and reduced crashes and non-fatal injuries among 16-year-old drivers per population. Trends in injuries among other road users involved in crashes with 16-year-old drivers were suggestive of a benefit from GDL, although observed decreases were not significant. Per licensed driver, findings were not significant, but suggested little change in crash involvement and decreased non-fatal injuries. Because one-third fewer 16-year-olds were licensed post-GDL, these results may suggest a selection effect in licensure. *Impact on Industry:* Because Maryland had nighttime restrictions for new drivers before 1999, this study suggests other components of GDL are beneficial for drivers and possibly for other road users. States with weak GDL laws should strongly consider revising them.

Keywords: Graduated Driver Licensing; Teenage Drivers; Traffic Safety; Injury Prevention

1. Problem

A large body of research has shown teenagers to be the highest risk age group for involvement in motor-vehicle crashes (Ulmer, Preusser, Williams, Ferguson, & Farmer, 2000). These high crash rates are generally attributed to driver immaturity and inexperience (Williams & Ferguson, 2002; McKnight & Peck, 2002; Cvijanovich, Cook, Mann, & Dean; 2001).

Graduated Driver Licensing (GDL) is designed to reduce the risks of teenage drivers by phasing in driving privileges, starting with supervision and lower risk driving circumstances and then progressing to full privileges (Insurance Institute for Highway Safety [IIHS], 2004; Williams & Ferguson, 2002; Shope & Molnar, 2004; Ulmer et al., 2000; Shope, Molnar, Elliot, & Waller, 2001; Dee, Grabowski, & Morrisey, 2005).

A Cochrane review of GDL research in 2004 concluded that GDL programs are generally beneficial (Hartling et al., 2004). Reduced teenage crash involvements following GDL have been reported in numerous states and provinces, including California, Michigan, Florida, Kentucky, North Carolina, Ohio, Utah,

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Table 1
Comparison of Maryland's graduated licensing law before and after July 1, 1999

	Minimum learner's permit age	Minimum holding period	Supervised driving hours	Entry to provisional stage (minimum age)	Minimum provisional period	Nighttime restriction
Pre-1999 GDL	15 years, 9 months	2 weeks	None	16 years	12 months	Midnight-5 a.m.
Post-1999 GDL	15 years, 9 months	4 months	40	16 years, 1 month	18 months	Midnight-5 a.m.

Wisconsin, British Columbia, New Zealand, Nova Scotia, South Australia, and Quebec (Bouchard, Dussault, Simard, Gendreau, & Lemire, 2000; Ulmer et al., 2000; Begg, Stephenson, Alsop, & Langley, 2001; Wiggins, 2004; Shope et al., 2001; Foss, Feaganes, & Rodgman, 2001; Hyde, Cook, Knight, & Olson, 2005; Huitt, 2004; O'Connor & Giles, 2000; Hartling et al., 2004; Mayhew, Simpson, Desmond, & Williams, 2003; Rice, Peek-Asa, & Kraus, 2004). Evaluations of GDL commonly are cross-sectional comparisons of crash involvement rates before and after implementation of GDL, and most start follow-up about 6 months to one year after GDL takes effect in order to decrease overlap of young drivers subject to the prior laws (Hartling et al., 2004). Except for Shope and Molnar (2004), evaluations of state GDL laws typically have reviewed data for no more than two full years following the implementation date (Bouchard et al., 2000; Ulmer et al., 2000; Shope et al., 2001; Foss et al., 2001; Hyde et al., 2005; Huitt, 2004; O'Connor & Giles, 2000).

Previous studies have calculated crash rates per population or per licensed driver (Hartling et al., 2004). Those studies that examine driver involvements per population are assessing the public health impact of GDL while studies that examine involvements per licensed driver are assessing whether GDL produces safer drivers. Relatively few studies have looked at outcomes per licensed driver and some have noted difficulties in using this rate because of inconsistent availability of this information in their state (Shope et al., 2001).

Very little data exist on the effects of GDL on road users other than 16-year-old drivers and no such studies have been done in the United States. In Canada, Bouchard et al. (2000) examined injuries and fatalities of people involved in a crash with a driver under age 25 years and reported significant decreases in rates of injuries and fatalities per licensed driver after the implementation of GDL. Studying the effects of GDL on other road users is important because young drivers have significantly elevated involvements in collisions that kill and injure their passengers, occupants of other vehicles, and non-occupants, including pedestrians and bicyclists compared to other age groups (AAA Foundation for Traffic Safety; 2006; Braver & Trempel, 2004; Dellinger, Kresnow, White, & Sehgal, 2004). The purpose of this study is to investigate the effect of Maryland's Graduated Driver Licensing law (implemented July 1, 1999) on the rates of driver involvements in crashes, non-fatal injuries, and fatalities among 16-year-old drivers and road users involved in their collisions, including passengers, occupants of other vehicles, and non-occupants (primarily pedestrians). Maryland's full GDL extended the minimum holding time for a learner's permit from 2 weeks to 4 months, added a requirement for 40 hours of supervised driving time, and made progression to a full license contingent upon remaining free of traffic convictions (Maryland Motor Vehicle Administration, 2005). A prohibition on unsupervised driving between midnight and 5 a.m. was in effect for new drivers prior to the 1999 law, and the duration of this night driving restriction was increased from 12 months to 18 months (Table 1).

2. Methods

Data on crashes, non-fatal injuries, and fatalities in Maryland were obtained from the Maryland Automated Accident Reporting System (MAARS), which contains information on all crashes reported to police involving a vehicle being towed away, personal injury, or a fatality (Maryland State Police, 1993; MAARS, 1996–1998; 2001–2003). Age-specific population estimates were obtained from the U.S. Census Bureau. Age-specific licensed driver estimates were obtained from the Maryland Motor Vehicle Administration (MVA, 1996–1998; 2001–2003).

Comparisons of outcomes were made between the three-year period preceding GDL (1996–1998) and a three-year period

Table 2
Sixteen-year-old population, licensure rates, and drivers involved in police-reported crashes by alcohol and gender, Maryland license file, Maryland Automated Accident Reporting System, and Maryland State Data Center, 1996–98 and 2001–03

Year	16-year-old population	16-year-old licensed drivers (% of population)	Crash-involved 16-year-old drivers		
			Drivers in police-reported crashes	Alcohol involvement (%)	Gender (% male)
1996	65,867	22,364 (34)	3,514	1.1	56
1997	66,618	22,609 (34)	3,698	1.0	55
1998	69,791	23,509 (34)	3,553	1.3	56
2001	75,078	19,591 (26)	3,286	1.4	53
2002	76,362	20,086 (26)	3,568	1.3	53
2003	78,075	19,674 (25)	3,413	1.5	55