



California's graduated driver license law: Effect on teenage drivers' deaths through 2005

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Abstract

Problem: While many researchers believe Graduated Driver Licensing (GDL) laws save lives by imposing restrictions and delayed licensure on drivers under age 18, longer term effects on older teenagers have not been studied. **Method:** The effects of California's strict GDL law on deaths of drivers ages 16–19 were analyzed for 1995–2005 using Incidence Rate Ratios (IRR) and Auto-Regressive Integrated Moving Average (ARIMA) time series analysis of Fatality Analysis Reporting System mortality data. **Results:** The two methods yielded similar results. IRR analysis found California 16-year-old drivers subject to the GDL experienced a 15% fatality decline (95% CI, 0.70–0.99), while 18 year-old drivers experienced a 15% increase (95% CI, 1.02–1.27). ARIMA analysis found 16 year-old drivers experienced a near-significant 20% fatality decline ($p=0.07$), while 18 year-olds experienced a 24% increase ($p=0.01$). Unlicensed teenage drivers and older teen drivers driving alone and transporting teenage passengers suffered significant fatality increases. **Summary and Discussion:** California's GDL may negatively affect older teenagers and other driver subpopulations and merits reevaluation.

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1. Problem

A number of studies link state graduated driver licensing (GDL) programs to reduced traffic fatalities among younger teenagers, and many researchers have pronounced these multistaged, supervised training, and probationary periods an unqualified success (Chen, Baker, & Li, 2006; Morrissey, Grabowski, Dee, & Campbell, 2006; Foss, Feaganes, & Rodgman, 2001; Shope, Molnar, Elliott, & Waller, 2001). “No additional research is needed to justify the need for GDL,” one major research review concluded in 2003 (Hedlund, Shults, & Compton, 2003, p. 108). GDL laws

reduce teenage traffic deaths and crash involvements by reducing their driving at younger ages and by improving their driving skills, this review reported.

California's GDL law, effective July 1, 1998, is considered among the most restrictive of any state (Masten & Hagge, 2003; Smith, Pierce, Ray, & Murrin, 2001). As summarized in Table 1, the law requires new teenage drivers to successfully complete a year-long, three-stage process to obtain a full privilege license (California Department of Motor Vehicles, 2006a,b). California's GDL program has been associated in several studies with reduced traffic fatalities and crashes among 16-year-olds (Cooper, Gillen, & Atkins, 2004; Rice, Peek-Asa, & Kraus, 2004; Williams, Nelson, & Leaf, 2002), though one disagrees (Masten & Hagge, 2004) and one warns that GDL laws may have unintended consequences for older teenagers (Males, 2006).

Unfortunately, few longer-term analyses of the effects of GDL programs, particularly on older teenage drivers, appear to exist (Dee, Grabowski & Morrissey, 2005; Hedlund et al.,

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Table 1

Minimum requirements for teenage drivers' licensure before and after implementation of California's Graduated Driver Licensing (GDL) law

Before GDL.

California's previous provisional licensing program, implemented October 1, 1983, included the following components for licensing of applicants under age 18:

- 1-month instruction permit period allowing driving only when supervised by parent/guardian, spouse, or licensed adult 25 years of age or older.
- Teen driver successfully completes driver education and driver training course.
- Parent certification that teen successfully completed exercises in parent/teen guide and is skilled enough to pass DMV driving test.
- Control program monitoring violations in first year after licensing. Under GDL (California Vehicle Code Section 12814), beginning July 1, 1998:

Stage 1. Supervised learner's permit process (minimum 6 months):

- Parent/guardian certifies that teen driver completed 50 hours of behind-the-wheel practice (10 hours of which must be at night) supervised by a parent/guardian, spouse, adult age 25 or older, or certified driving instructor.
- Teen driver successfully completes driver education and driver training course.
- Teen driver, except in specified circumstances, may not drive between midnight and 5 a.m., or transport passengers under age 20, unless supervised as defined above.

Stage 2: Provisional licensing stage (12 months, or until 18th birthday)

- Provisional license granted if student driver is over 16 but less than 18 and passes advanced driver training and behind-the-wheel test.
- Unless accompanied by licensed driver age 25 or older, student may not transport passengers under age 20 between midnight and 5 a.m.
- Amendments, effective January 1, 2006, extend the prohibition on new, unsupervised drivers under age 18 driving from 11 p.m. (rather than midnight) to 5 a.m., and transporting passengers younger than 20 to one year (rather than 6 months).

Stage 3: Student granted full-privilege license after first two steps successfully completed if there are no outstanding DMV or court-ordered restrictions, suspensions, or probations.

From: California Department of Motor Vehicles, 2006a,b.

2003; Simpson, 2003). This study uses data through 2005 to examine the association of California's GDL law with fatalities involving teenagers and drivers ages 16–19 licensed before and after the law took effect.

2. Method

2.1. Data sources

The U.S. Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS Web-Based Encyclopedia, 2006), using law enforcement reports and investigations by trained data collectors, provides details on accidents involving motor vehicles on public roadways that cause at least one fatality. These details include the date, types of vehicles involved, and location of each crash, and the age, sex, injury severity, driver's licensing state, driver's license status, and zip code of residence for each driver and passenger involved. Of interest to this study are FARS tabulations for the years 1995 through 2005 (the most recent year available at this writing) of

drivers and passengers killed in motor-vehicle crashes who are residents of California. The Research and Development Division, California Department of Motor Vehicles (2006a, b), provides numbers of licensed drivers by age and year for 1995 through 2005. The Demographic Research Unit, California Department of Finance (2006), provides annual estimates and projections of the state's population, including by age and year. These two population sets are used to calculate fatality rates.

2.2. Outcome measure

FARS data allow a choice of outcome measures, principally (a) involvements of drivers, both fatal and nonfatal, in fatal motor-vehicle accidents, and (b) actual fatalities. After preliminary evaluation of these two measures, this paper uses driver fatalities as the outcome measure of interest. The reason is that the percentage of fatal accidents involving teenagers that resulted in a teenage fatality—that is, the “deadliness” of teenage fatal crashes—increased steadily and significantly over the study period. The percentage of all fatal accident involvements resulting in a teenage death increased from 29.9% in 1995 to 33.2% in 2005; for teenage drivers, from 27.5% to 32.2%; and for licensed teenage drivers, from 29.7% to 39.0%. A similar, weaker trend is observed among 20–44 year-olds used as a comparison group. The cause of the increased deadliness of teenagers' fatal crash involvements in recent years compared to earlier years, and whether this trend might be related to the GDL law, is not explored in this paper. Driver fatalities, a more serious and more consistent outcome than fatal crash involvements, is used as the chief outcome measure here.

2.3. Age groups

Most studies have examined the effects of GDL laws only on 16-year-old drivers; a few have included age 17. This study extends the analysis of the longer-term effects of GDL laws by including ages 18 and 19, for whom several years of postlaw experience have now accumulated, a choice that raises several issues. Because California's GDL law allows teenagers to avoid its requirements if they wait until age 18 to obtain their drivers licenses, and because some 18- and 19-year-olds in fatal accidents could have moved to California from states without GDL laws, it could be argued that 18–19-year-olds' traffic fatality and driver involvement experiences cannot be evaluated in the same way as 16–17-year-olds, nearly all of whom would have been subjected to the law. However, this study treats ages 18–19 the same as 16–17 for several reasons. First, any postlaw change in traffic deaths involving teenagers who waited until age 18 to obtain licenses to avoid the GDL program would be a consequence of the GDL law, rendering their traffic fatality experience as valid a subject for evaluation as any postlaw decrease in traffic deaths involving 16-year-olds who deferred driving because of the law. California Department of Motor Vehicle

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