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Original article

Young Driver Compliance With Graduated Driver Licensing Restrictions Before and After Implementation of a Decal Provision

Aimee J. Palumbo, Ph.D., M.P.H. [a,b,*], Melissa R. Pfeiffer, M.P.H. [a], Michael R. Elliott, Ph.D., M.S. [c,d], and Allison E. Curry, Ph.D., M.P.H. [a]

[a] *Center for Injury Research and Prevention, Children's Hospital of Philadelphia, Philadelphia, Pennsylvania*
[b] *Penn Injury Science Center, University of Pennsylvania, Philadelphia, Pennsylvania*
[c] *Department of Biostatistics, School of Public Health, University of Michigan, Ann Arbor, Michigan*
[d] *Survey Methodology Program, Institute for Social Research, University of Michigan, Ann Arbor, Michigan*

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A B S T R A C T

Purpose: In May 2010, New Jersey implemented the first-in-the-nation decal provision to increase intermediate drivers' compliance with Graduated Driver Licensing restrictions and ultimately reduce young driver crashes. We previously found that the provision was associated with a 9.5% decline in crash rates. This study evaluates whether the decal provision was associated with an increase in compliance with passenger and nighttime restrictions.
Methods: We analyzed New Jersey driver licensing and crash data from 2008 through 2012. We used the quasi-induced exposure method to estimate prevalence of noncompliance among 20,593 nonresponsible 17- to 20-year-old intermediate drivers involved in crashes. Multivariate log-binomial regression models compared the monthly prevalence of noncompliance with restrictions pre and post implementation, adjusted for age, sex, season, and area income and population density. Analyses were conducted in 2016–2017.
Results: Overall estimated noncompliance with the nighttime restriction was 1.75% before and 1.71% after the decal provision ($p = .83$). Noncompliance with the passenger restriction was 8.68% before and 8.31% after ($p = .35$). Introduction of the decal provision was not associated with a change in noncompliance rates.
Conclusions: Compliance rates among New Jersey intermediate drivers were high both before and after the decal provision. Findings do not suggest that the decline in crash rates following implementation was because of increased compliance with nighttime or passenger driving restrictions. Additional research is needed to understand mechanisms by which decal provisions may reduce young driver crashes.

IMPLICATIONS AND CONTRIBUTIONS

This is the first study to evaluate the effect of a decal provision on compliance with GDL restrictions using objective data. Compliance rates with nighttime and passenger restrictions remained high and unchanged after the provision, suggesting that compliance was not the mechanism through which the decal requirement reduced crash rates.

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* Address correspondence to: Aimee J. Palumbo, Ph.D., M.P.H., Center for Injury Research and Prevention, Children's Hospital of Philadelphia, 2716 South Street, 13th Floor, Philadelphia, PA 19146.
E-mail address: aimeep@upenn.edu (A.J. Palumbo).

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Motor vehicle crashes are the leading cause of death among U.S. adolescents [1]. To address this public health issue, state-level Graduated Driver Licensing (GDL) systems restrict intermediate (i.e., newly licensed) drivers from driving in higher risk conditions, which include driving at night and with multiple passengers, while on-road experience is gained [2]. National GDL evaluations have indicated that these restrictions are effective at reducing fatal crashes involving adolescents [3–5]. However, enforcement of GDL restrictions by police requires a traffic stop and visual inspection of the driver's license. This may limit both police enforcement of and young drivers' compliance with GDL passenger and nighttime restrictions and ultimately limit the effectiveness of GDL in reducing crashes [6,7].

In an effort to improve the effectiveness of GDL, numerous international jurisdictions have introduced provisions requiring these drivers to display a vehicle identifier indicating their intermediate license status [8]. The causal pathways by which decal provisions have been hypothesized to reduce crashes is depicted in Figure 1. Decal provisions are hypothesized to encourage young intermediate drivers' compliance with GDL nighttime and passenger restrictions and avoidance of other higher risk driving behaviors, subsequently reducing crashes [9]. Further, improving the ability of police to enforce these restrictions may be expected to improve drivers' future willingness to comply with GDL restrictions or drive safer. However, the impact of decal provisions on intended outcomes—compliance, enforcement, and ultimately crashes—had not been rigorously examined.

On May 1, 2010, New Jersey (NJ) implemented the United States' first decal provision, which required all drivers under the age of 21 with a learner's permit or intermediate license to display red, reflectorized decals on their front and back license plates while driving. Several previous studies have evaluated NJ's decal provision [10–12]. Two studies we previously conducted indicated a sustained 9.5% decrease in police-reported crashes among intermediate drivers over the first 2 years after implementation and an increase in police enforcement that was primarily limited to the first year post implementation [10,13]. With respect to compliance with nighttime and passenger restrictions, a study that conducted telephone and online surveys of NJ intermediate drivers before and after the provision found that the proportion who reported violating nighttime and passenger restrictions in the past month actually increased from the pre- to post-decal period [12]. However, surveys likely overestimate the true extent of young road users' noncompliance as they reduce what is theoretically a continuous measure—the proportion of miles or trips in which a driver did not comply—into a categorical (e.g., ever: yes/no) or ordinal (e.g., how often: Likert scale) variable [14]. Additionally, low response rates may have limited representativeness and generalizability. Finally, the study reported that drivers' awareness of the new GDL requirements increased in the post-decal period, increasing the potential that response-shift bias may have influenced pre-post survey compliance estimates. Thus, the hypothesis that decal provisions lead to increased compliance with GDL restrictions among intermediate drivers has not yet been rigorously evaluated.

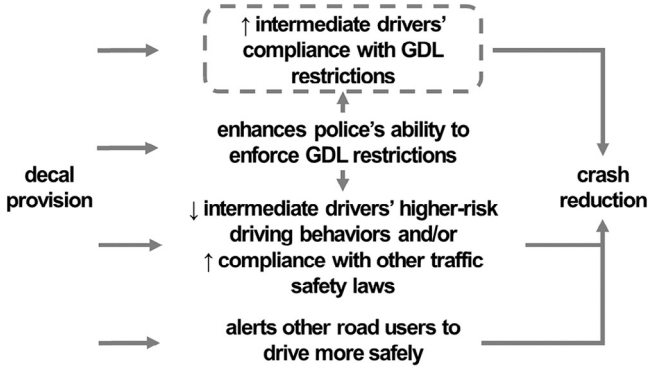

Figure 1. Hypothesized causal pathway from decal provision to crash reduction (evaluated mechanism highlighted).

Our objective was to evaluate the association between implementation of NJ's decal provision and the rate of young intermediate drivers' compliance with passenger and nighttime restrictions. Specifically, we analyzed a unique linked data warehouse containing statewide driver licensing and crash report data to determine whether compliance changed in the 2 years after the provision compared with the 2-year pre-provision period.

Methods

New Jersey GDL system

NJ's GDL system was introduced in 2001 and requires all new drivers under the age of 21 to progress through three licensing phases: learner's permit, intermediate license, and full license [12]. Under NJ's current GDL program, residents are eligible for an intermediate license at age 17 following a minimum 6-month learner's permit phase; intermediate licenses are subject to a 1-year holding period. During this phase, drivers are limited to one passenger unless a parent/guardian is in the vehicle and are prohibited from driving from 11:01 PM through 4:59 AM. With proper documentation, NJ intermediate drivers are eligible for exemption from the nighttime restriction for employment or religious reasons. In addition, beginning on May 1, 2010, young drivers with a learner's permit or intermediate license are required to purchase (US$4) and display a pair of red, reflectorized decals on both license plates; all intermediate drivers were subject to the provision when it went into effect (i.e., no "grandfathering"). Notably, two other changes in NJ's GDL system occurred at the same time as the decal requirement (in May 2010): (1) a lowering of the nighttime restriction from midnight to 11:01 PM; and (2) removal of the exclusion for household members from the one passenger limit when unaccompanied by a parent or guardian—that is, driving multiple siblings without a parent/guardian was no longer exempt [12]. At a minimum of age 18 and following the intermediate license holding period, drivers are eligible for a full (unrestricted) license and must present to a licensing office to initiate this transition.

Data sources

We analyzed data from the New Jersey Traffic Safety Outcomes data warehouse, which contains linked data from two administrative sources—the NJ Motor Vehicle Commission's Licensing Database and the NJ Department of Transportation's Crash Database [10]. Detailed information on the process and validation of this linkage is available elsewhere [10,15]. In all, 98.4% of crash-involved NJ drivers under 21 were matched to a unique licensing record. The New Jersey Traffic Safety Outcomes data warehouse includes for every NJ driver over an 11-year period