

Measuring the impact of passenger restrictions on new teenage drivers

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Abstract

Passenger restrictions for new teenage drivers that became law in 1998 in California provide an opportunity to study the effectiveness of such laws in reducing the number of passengers as well as the influence of teenage passengers on novice drivers. Using fatal and injury crash data from California's Statewide Integrated Traffic Records System, this study found that teenage passengers are a causal factor in crashes of 16-year-old drivers and that in the three years following implementation of the new law, the average number of teenage passengers carried by 16-year-olds decreased by approximately 25%. Without considering the beneficial effect of a decrease in the crash rate, the decrease in the number of teenage passengers in actual crashes resulted in an estimated saving of eight lives and the prevention of 684 injuries over a three-year period.

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1. Introduction

The high risk represented by teenage novice drivers is well documented in crash statistics. In California, for example, teenage drivers make up only 4% of all licensed drivers, yet are responsible for 15% of the state's fatal and injury crashes. Sixteen-year-olds are six times more likely to cause a fatal and injury crash and nine times more likely to be involved in single vehicle crashes than adult drivers aged 25 to 54 years (Cooper et al., 2002). Surveys of individual teenagers have shown the importance of driving experience with self-reported per-mile crash rates dropping by almost one-half over the first 250 miles of driving and by almost two-thirds over the first 500 miles (McCartt et al., 2003). Crash statistics also show a more than three-fold increase in the crash rate of 16–17-year-old novice drivers with three or more passengers (Williams and Ferguson, 2002).

While teenage drivers have high death rates compared to older drivers, teenage passenger death rates exceed those of older passengers to an even greater extent. Almost as many teenage passengers as drivers are killed, especially at the age of 16 years (IIHS, 1999). Using data from the Fatal Accident Reporting System, Williams and Wells (1995) found that overall, 67% of teenage passengers were killed in passenger vehicles driven by other teenagers. For passengers

aged 15–17 years, more than 70% died in other teenagers cars while for 16-year-olds, the figure is 79%. Findings such as these have led to the inclusion of teenage passenger limits for novices driving on intermediate licenses under graduate licensing laws (GDL).

There are currently 20 states that place some form of restriction on teenage passengers, varying from outright bans to limiting the maximum number allowed (IIHS, 2003). Restricting the number of teenage passengers allowed to accompany novice drivers can have a beneficial effect on fatal and injury crashes in two ways. First, there is evidence to suggest that the presence of teenage passengers increases the risk of a crash (Lin and Fearn, 2003). Restricting the number of such passengers might be expected to reduce the crash rate of novice drivers. Introduction of passenger limits under the New Zealand GDL yielded a 9% reduction in the proportion of crashes involving teenage passengers of drivers on intermediate licenses (Begg et al., 2001). A report on the impact of the GDL in San Diego County (Smith et al., 2001) showed a decrease of “borderline significance” ($0.05 \leq P \leq 0.10$) during 2000 in the percentage of crashes with at least one teenage passenger. Second, given that a crash occurs, fewer passengers means fewer potential victims. To date, though, the effects of passenger restrictions on the number of teenage passengers have not been conclusively demonstrated.

A revision of the California GDL, which took effect on July 1, 1998, specifies that new provisional license hold-

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ers (all licensees under an of age 18 years hold provisional licenses) may not transport passengers under 20 years of age for the first 6 months, unless supervised by a parent, guardian, driving instructor, or adult aged 25 years or older. The purpose of our research was to determine to what extent the new passenger restrictions had an impact on crashes involving 16-year-old drivers and their passengers. In effect, did the law save lives and reduce injuries.

Our analysis focused on 16-year-old drivers for two reasons. First, at least theoretically, the last drivers who could still be subject to the old law did not pass out of the system (turn 18) until June 2001. Since the new law would not affect the behavior of this group, their inclusion in the study could easily mask changes in the affected group. Second, since the key restrictions of the new law apply for a limited time (6 months for passengers and 1 year for curfew) and since approximately 45% of teenagers acquire their license by the age of 16.5 years, a large segment of the 17-year-old driver population was not subject to the laws restrictions. Drivers in the 20–24-year-old age group are used for comparison.

We begin with the “DATA” section in which the type and source of the data used are discussed. Next, under the heading “TEENAGE PASSENGERS,” an analysis of the influence of and changes in passengers is presented. Given the nature of the new restrictions, if the law were to have an effect we would expect to see it reflected in the number of teenage passengers being carried by 16-year-old drivers.

Both teenage passengers as a causal factor and changes in the number of teenage passengers are addressed in this paper. We begin by showing that carrying teenage passengers does, in fact, increase the risk of causing a crash and then we show how the new law has reduced the number of teenage passengers, thus saving lives and preventing injuries.

2. Data

All crash and passenger data included in this report are obtained from the California Statewide Integrated Traffic Records System (SWITRS). SWITRS processes all reported collisions which occur on California’s state highways and all other roadways, excluding private property.

Since property-damage-only (PDO) crashes are not consistently reported by the various agencies throughout the state, they are considered indicators of the volume of traffic collisions only and are not exact statistics (CHP, 1999). For this reason, all crashes used for this study are fatal or injury crashes. Additionally, only drivers of cars, vans, or light trucks and their passengers are included.

In this paper, we will look at teenage passengers as a causal factor as well as the changes brought about by the new licensing law.

3. Teenage passengers as a causal factor

If carrying passengers has no effect on the accident rate for 16-year-old drivers, we would expect to see 16-year-olds who cause crashes to be carrying passengers at the same rate as those who do not cause crashes.

3.1. Methodology

Two comparisons were made. First, the percentage of 16-year-olds who were at-fault in crashes and were carrying at least one teenage (13–19 years old) passenger was compared to the percentage of 16-year-olds who were not-at-fault in crashes and were carrying at least one teenage passenger. The test was then repeated using 15–17-year-old passengers. To be counted in these comparisons, drivers must be carrying ONLY passengers of the correct age or be carrying no passengers. For example, a car carrying a 17-year-old and a 20-year-old passenger would not be used.

While it can be argued that the assignment of fault is neither entirely objective nor consistent from jurisdiction to jurisdiction, there is no reason to believe that the presence or absence of passengers would significantly affect the decision of the investigating officer. Thus, the quality of the final assignment of fault should not affect the results of this comparison.

3.2. Causal factor results

Fig. 1 illustrates the results for 16-year-old drivers carrying teenage passengers. A two-sample *t*-test assuming

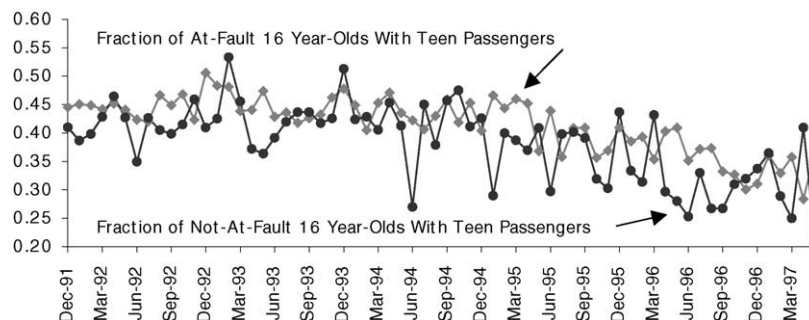


Fig. 1. Fraction of 16-year-old drivers in crashes with teenage passengers.

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