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Estimating the over-involvement of suspended, revoked, and unlicensed drivers as at-fault drivers in California fatal crashes

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ABSTRACT

Introduction and Method: Quasi-induced exposure analysis was used to estimate annual fatal crash involvement rates for validly licensed, suspended or revoked (S/R), and unlicensed drivers in California from 1987 through 2009 using fatal crash data obtained from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System and crash culpability determinations from the California Highway Patrol's Statewide Integrated Traffic Records System. *Results:* Although there was some year-to-year fluctuation in the annual estimates, S/R and unlicensed drivers were over-involved as at-fault drivers in fatal crashes during every year of the 23-year time period relative to validly licensed drivers. The fatal crash involvement ratios combined across all years were 0.86 for validly licensed drivers, 2.23 for S/R drivers, and 2.34 for unlicensed drivers. Hence, compared to validly licensed drivers, the odds of being at-fault for a fatal crash were 160% higher for S/R drivers (involvement ratio = 2.60) and 173% higher for unlicensed drivers (involvement ratio = 2.73). The excess risks of S/R and unlicensed drivers are somewhat lower than estimates found in a prior study using the same technique, but the results nonetheless provide evidence that S/R and unlicensed drivers are much more hazardous on the road than are validly licensed drivers and emphasize the importance of using strong countermeasures—including vehicle impoundment—to reduce their high crash risk. These findings support interventions to help reduce driving among S/R and unlicensed drivers.

1. Introduction

The number of drivers involved in fatal crashes who did not have a valid license at the time of the crash increased by 17% nationally and 49% in California from 1998 through 2007 (National Highway Traffic Safety Administration [NHTSA], 2009a, 2009b). One out of every five fatal crashes in the United States involves an unlicensed or invalidly licensed driver (AAA Foundation for Traffic Safety, 2011; Griffin & DeLaZerda, 2000). When compared to validly licensed drivers, it is estimated that suspended/revoked (S/R) and unlicensed drivers are 3.7 and 4.9 times more likely to have caused fatal crashes in which they are involved, respectively (DeYoung, Peck, & Helander, 1997). In addition, crashes caused by unlicensed drivers tend to be more severe and are more likely to involve a fatality than those caused by licensed drivers (Watson, 2004).

In California about 1.9 million individuals are estimated to be under a license suspension or revocation action at any given time (Roberts, 2002).[1] Driving privileges can be suspended or revoked due to driving-related reasons such as being convicted of a serious traffic violation, accumulating too many negligent-operator points on the driving record, inadequate driving skills, and having a physical or mental condition that compromises safe driving ability, and also reasons having nothing to do with driving, such as failure to pay child support, or conviction for non-traffic related offenses such as graffiti or vandalism (Gebers & DeYoung, 2002). License suspension and revocation reduce subsequent traffic violations and crashes among treated drivers, even though most continue to drive during the period of suspension or revocation, because they tend to drive less often and more carefully to avoid detection (Clark & Bobevski, 2008; Hagen, McConnell, & Williams, 1980; NHTSA, 2008; Ross & Gonzales, 1988). Less is known about unlicensed drivers in California because these drivers only come to the attention of the California Department of Motor Vehicles (DMV) when they are involved in a crash or convicted of a traffic violation. It is likely that the percentage of drivers in this group who are ineligible for a license due to inadequate legal-presence status increased in California following implementation of a law on January 1, 1994 that requires driver license applicants to provide a valid Social Security number and documents proving that their presence in California is authorized under federal law before they can be issued a driver license.

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[1] License suspension temporarily withdraws the driving privilege, while license revocation terminates it with the possibility of reinstatement at the end of the revocation period.

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While S/R and unlicensed drivers are known to pose elevated safety risks to other road users, the risks have been difficult to estimate due to the lack of complete and reliable data on the concentrations of such drivers on the road, the conditions in which they drive, the numbers of miles they travel, their driving times and locations, and other exposure variables that influence their risk levels. The lack of good and easily obtainable exposure information often results in exposure not being considered at all when estimating crash risk. When attempts are made to estimate exposure-adjusted crash rates for a group, they usually rely on crude exposure measures such as number of group members in the overall population, number of licensed drivers in the group, miles driven by drivers in the group, and number of vehicles owned by group members, all of which are limited in scope and often unreliable (Stamatiadis & Deacon, 1997). More recently, risk assessment methods have been used that estimate exposure directly from the crash data. Such methods, commonly referred to as "induced exposure" techniques, can produce exposure and risk estimates that are more reliable and less biased than what is possible through other means. The concept of induced exposure and its use in estimating traffic crash risk was introduced in the 1960s by Thorpe (1964). Thorpe determined that the likelihood of a non-responsible driver being involved in a crash is proportional to the likelihood of meeting that driver on the road. The quasi-induced exposure (QIE) technique used in the present study is based on a refinement of Thorpe's concept made by Carr (1969). Carr's method calculates the exposure-adjusted crash rate for a given group by dividing the group's proportion of all crash-involved at-fault drivers by the group's proportion of all crash-involved innocent drivers. The QIE technique assumes that nonresponsible drivers involved in collisions are a statistically random sample of all drivers on the road (Chandraratna & Stamatiadis, 2009). If this assumption is met, then the exposure-adjusted crash risk for a given type of driver can be determined by comparing how frequently drivers of this type appear among at-fault drivers to how frequently such drivers appear among innocent drivers (Carr, 1969; Lardelli-Claret et al., 2006).

The elevated risk that S/R and unlicensed drivers pose to other road users has been of ongoing interest and concern to the traffic safety community. Since the composition and risks of S/R and unlicensed driver populations likely change over time, it is important to have updated estimates of their crash risk. This study addresses this need by applying the QIE technique to estimate annual exposure-adjusted fatal crash involvement rates for S/R, unlicensed, and validly licensed drivers in California from 1987 through 2009. The methodology used is the same as that used in an earlier seminal study by DeYoung et al. (1997), with the exception of crash culpability being based on law enforcement officer determination rather than on having been cited for a traffic violation, which may have biased the DeYoung et al. estimates given that killed drivers are typically never cited. The goal was to create updated and less-biased estimates of the at-fault fatal crash risks for S/R and unlicensed drivers compared to those for validly licensed drivers.

Table 1
Number (*N*) of two-vehicle fatal crashes excluded from the QIE analyses for various reasons.

Reason for exclusion	*N*
Original FARS sample	27,483
Excluded due to wrong vehicle type	15,316
Excluded due to wrong license status	1380
Excluded due to duplicate matching data	8
Excluded due to missing matching data	18
Excluded due to non-match with SWITRS	1229
Excluded due to unknown fault status	197
Excluded due to neither driver at fault	565
Final QIE sample	8770

Table 2
Number (N) and percentage of drivers in the study's sample of two-vehicle fatal crashes from 1987 through 2009 by age group and license status.

Age group	Validly licensed		S/R		Unlicensed	
	N	%	N	%	N	%
19 or younger	1521	10.35	104	6.31	297	24.87
20–29	3798	25.84	770	46.69	587	49.16
30–39	2772	18.86	428	25.96	190	15.91
40–49	2232	15.19	208	12.61	64	5.36
50–59	1521	10.35	72	4.37	26	2.18
60–69	1125	7.65	33	2.00	18	1.51
70–79	1018	6.93	19	1.15	6	0.50
80–89	642	4.37	11	0.67	6	0.50
90 or older	68	0.46	4	0.24	0	0.00
Total	14,697	100.00	1649	100.00	1194	100.00

Note. Percentages for the unlicensed group do not total to 100.00% due to rounding.

2. Methods

2.1. Data sources and coding

Data on fatal crashes in California from 1987 through 2009 were gathered from the Fatality Analysis Reporting System (FARS) maintained by the National Highway Traffic Safety Administration (NHTSA), and from the Statewide Integrated Traffic Records System (SWITRS) maintained by the California Highway Patrol (CHP). FARS contains data on all crashes that resulted in the death of a vehicle occupant or non-motorist within 30 days of the crash. SWITRS contains data on all police-reported crashes that occurred in California on public roadways. While both of these sources provide data on fatal crashes, it was necessary to access both because neither alone provided all the information needed for the current study. Specifically, only FARS contains information on license status (valid, S/R, or unlicensed), and only SWITRS contains information on which driver the investigating law enforcement officers deemed to have caused the crash. While FARS identifies drivers who were cited for traffic violations preceding the crash, this information was not used to establish culpability because, among other reasons, at-fault drivers who are killed in crashes are commonly not cited for their violations, perhaps due to complications involved with showing up for court and paying fines post-mortem. The crash data obtained from FARS and SWITRS were merged so that both license status and fault information were available for each individual driver for analysis purposes. The variables used for the merge were crash date (year, month, day), crash time (hour, minute), driver age (years), driver sex, and vehicle model year. The matching was done at the party (driver) level.

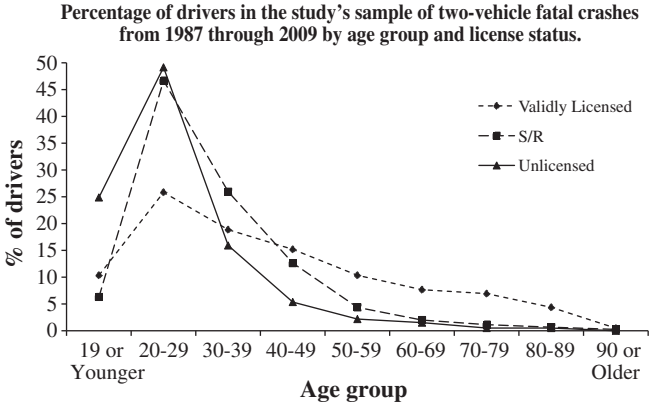

Fig. 1. Percentage of drivers in the study's sample of two-vehicle fatal crashes from 1987 through 2009 by age group and license status.