Effects of Graduated Driver Licensing on Fatalities in 16-Year-Olds
Ediriweera Desapriya, Pamela Joshi and Ian Pike

Pediatrics 2006;118;2252-2253
DOI: 10.1542/peds.2006-2165

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://www.pediatrics.org/cgi/content/full/118/5/2252
beneficial in children with low degrees of reflux (I, II, and III), the study suffered from many methodologic flaws. Antimicrobial treatment of the acute episode was not standardized, and a placebo was not administered to the control group. Neither subjects nor physicians were blinded to the treatment assignment. The microbiology of initial and breakthrough episodes of urinary tract infection were not provided. Children who experienced 2 episodes of pyelonephritis during the year were excluded from analysis, as were children who were not adherent to their prophylactic therapy. Most worrisome of the methodologic problems, which weakens the study, was the performance of the primary analysis only on patients who completed the 1-year follow-up; an intention-to-treat analysis was not performed. Additional studies that systematically address this important question are warranted before the practice of performing voiding cystourethrograms after a first febrile urinary tract infection in young children is abandoned. A large, prospective, placebo-controlled, multicenter clinical trial assessing the effectiveness of antimicrobial prophylaxis in patients with reflux is being funded by the National Institutes of Health and is about to start. I am waiting to decide whether to change practice until the results of this trial are available, and I would advise others to do the same.

Ellen R. Wald, MD
Department of Pediatrics
University of Wisconsin Children’s Hospital
Madison, WI 53792

REFERENCE
doi:10.1542/peds.2006-2235

Effects of Graduated Driver Licensing on Fatalities in 16-Year-Olds

To the Editor.—

Motor vehicle crashes are the most common cause of death among youth populations in developed countries in the world.1 Among initiatives developed to reduce motor vehicle crash–related injuries, deaths, and traffic convictions among youth, graduated driver licensing (GDL) laws have demonstrated effectiveness. In particular, a recent retrospective study by Chen et al2 indicated that GDL program components leading to reduced motor vehicle crash fatalities were GDL programs that include age requirements and ≥3 months of waiting before the intermediate stage, nighttime driving restriction, and either ≥30 hours of supervised driving or passenger restriction.

Although Chen et al2 provided a valuable contribution to the evidence base, they seem to have overlooked important variables that could affect their outcome (motor vehicle crash fatality), including vehicle miles traveled, vehicle density (number of registered motor vehicles divided by length of roads), speed-limit regulations, alcohol-impaired–driving laws (zero tolerance laws, minimum drinking-age laws), and economic factors (rate of unemployment, real per-capita income, etc). When a relevant variable is omitted from a regression model, the resulting estimators of effect in the final model are biased because they share the variance that would have been attributed to the excluded variable. All factors need to be controlled for in a study of traffic crashes, and results of a study concentrating on a single program (ie, GDL) are possibly misleading. GDL programs cannot be considered to be effective without accounting for confounding in statistical analysis by other laws or programs that also seek to reduce motor vehicle crashes among youth.

Driving laws related to alcohol impairment are a particularly important confounder that could also be responsible for reductions in motor vehicle crash injuries and fatalities among youth. Zero tolerance laws, which make it illegal in every state for drivers younger than 21 to drive after any drinking, have significantly contributed to declines in alcohol-related traffic fatalities among people younger than 21. In 1995, the US Congress passed a law that requires states to adopt zero tolerance laws for drivers younger than 21. By 1998, all states had passed laws that made it illegal for any driver younger than 21 to have a positive blood alcohol content (BAC). Voas et al3 used data on all drivers younger than 21 involved in fatal crashes in the United States from 1982 through 1997. Quarterly ratios of BAC-positive to BAC-negative drivers in each of the 50 states were analyzed in a pooled cross-sectional time-series approach. After accounting for differences among the 50 states in various background factors, changes in economic and demographic factors within states over time, and the effects of other related laws, results indicated a significant 24.4% reduction in alcohol-positive drivers younger than 21 who were involved in fatal crashes associated with the zero tolerance laws. Similar results were shown by another systematic review4; therefore, this policy seems to have been significantly effective in reducing fatal crashes involving youth drivers.5,6

In addition to zero tolerance laws, other drinking-and-driving laws were also passed in the United States between 1995 and 2005. Many states now revoke or suspend the licenses of drunken-driving offenders who are under the legal age. Characteristics of crashes that take place with alcohol-impaired youth drivers include
speeding disproportionately, lack of restraint use, and driving older cars that are in poor repair. Primary and secondary seat belt-enforcement laws, increased speeding restrictions, and improved safety standards for vehicles and highway construction may all help reduce fatal crashes among young drivers. For instance, citizen and community-based advocacy groups have played important prevention roles in areas such as youth drinking and driving and enhancement of youth restraint use."

Further understanding of the effect of these factors in combination with GDL laws should help in the study and implementation of best practices to reduce youth-involved traffic crashes worldwide. Methodologically sound research is needed to evaluate GDL systems and identify which GDL elements produce the greatest crash reductions. To the extent possible, researchers should seek to use appropriate statistical methods that facilitate comparisons across jurisdictions, acknowledging the considerable variation in GDL laws and effects of non-GDL laws and systems across different jurisdictions.

Ediriweera Desapriya, PhD
Pamela Joshi, MSc
Ian Pike, PhD
BC Injury Research and Prevention Unit
Department of Pediatrics
Centre for Community Child Health Research
Vancouver, British Columbia, Canada V6H 3V4

REFERENCES

In Reply.—

The letter by Desapriya et al concerns 2 issues: exposure measurement and unmeasured variables. We appreciate the opportunity to clarify them. We did not use vehicle miles traveled as our exposure measure but instead based our analysis on population of 16-year-olds, because our focus was the net benefit of graduated driver licensing (GDL) in reducing motor vehicle mortality among 16-year-olds. We did acknowledge in our discussion section that, in the absence of exposure data, it was impossible to determine the extent to which the observed GDL-associated reduction in fatal crashes was attributable to decreased exposure to driving or decreased crash-instance density.

Confounding by unmeasured variables is a concern inherent in all observational studies, including the studies cited by Desapriya et al. Traffic safety can be affected by numerous factors related to the environment, the driver, and the vehicle. There is no way other than a randomized, experimental design to control for all the possible confounders. We approached the issue of unmeasured variables by applying the most appropriate statistical methods and by constructing the most sensible and parsimonious statistical model. Specifically, to control for unmeasured variables we included design variables indicating individual states and crash data for 2 older age groups (20–24 and 25–29 years) that were unaffected by GDL regulations but might be similarly affected by other variables such as traffic density, weather conditions, and seat belt laws. The observed GDL-associated reduction in fatal crashes among 16-year-olds cannot be plausibly explained by such policy interventions as the minimum drinking-age and zero tolerance laws, because these regulations were implemented at a different time frame and would most likely influence alcohol-related crashes that account for only a small percentage (~16%) of all fatal crashes involving 16-year-old drivers.

As important as it is, evaluation research is an imperfect science. Bias resulting from unmeasured variables is only one of the issues facing researchers. More challenging is the intricacy of social and environmental factors, which is often too complex to disentangle. We agree with Desapriya et al that our study adds valuable information to the mounting evidence base for refining and enhancing GDL programs to further reduce injury mortality and morbidity among adolescents.

Guohua Li, MD, DrPH
Department of Emergency Medicine
Johns Hopkins University School of Medicine
Baltimore, MD 21209

Li-Hui Chen, MS, PhD
National Center for Health Statistics
Centers for Disease Control and Prevention
Hyattsville, MD 20782

Susan P. Baker, MPH
Johns Hopkins School of Public Health
Center for Injury Research and Policy
Baltimore, MD 21205
Effects of Graduated Driver Licensing on Fatalities in 16-Year-Olds
Ediriweera Desapriya, Pamela Joshi and Ian Pike
*Pediatrics* 2006;118;2252-2253
DOI: 10.1542/peds.2006-2165

<table>
<thead>
<tr>
<th>Updated Information</th>
<th>including high-resolution figures, can be found at:</th>
</tr>
</thead>
<tbody>
<tr>
<td>References</td>
<td><a href="http://www.pediatrics.org/cgi/content/full/118/5/2252">http://www.pediatrics.org/cgi/content/full/118/5/2252</a></td>
</tr>
<tr>
<td>Subspecialty Collections</td>
<td>This article cites 7 articles, 3 of which you can access for free at:</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.pediatrics.org/cgi/content/full/118/5/2252#BIBL">http://www.pediatrics.org/cgi/content/full/118/5/2252#BIBL</a></td>
</tr>
<tr>
<td>Permissions &amp; Licensing</td>
<td>Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.pediatrics.org/misc/Permissions.shtml">http://www.pediatrics.org/misc/Permissions.shtml</a></td>
</tr>
<tr>
<td>Reprints</td>
<td>Information about ordering reprints can be found online:</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.pediatrics.org/misc/reprints.shtml">http://www.pediatrics.org/misc/reprints.shtml</a></td>
</tr>
</tbody>
</table>