

Florida's Motorcycle Helmet Law Repeal and Fatality Rates

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On July 1 2000, the State of Florida exempted adult motorcyclist and moped riders from wearing helmets provided they have medical insurance of \$10000. Monthly time series of motorcycle occupant deaths are examined from 1/1994 to 12/2001. The interrupted time series analysis estimates a 48.6% increase in motorcycle occupant deaths the year after the law change. The impact estimate reduces to 38.2% and 21.3% when trends in travel miles and motorcycle registrations are controlled. Our findings suggest that the law's age exemption should be revoked. (*Am J Public Health*. 2004;94:556–558)

Between 1997 and 2001, nationwide motorcycle rider fatalities increased by 50% while motorcycle registrations increased by 31%.^{1,2} The rise in death rates may be related to the concurrent weakening of motorcycle helmet laws in Arkansas, Texas, Kentucky, Louisiana, and Florida. In comparing rates the year before (1996) and the year after (1998) the helmet law change, Preusser et al.³ found a 21% increase in motorcyclist deaths in Arkansas and a 30% increase in Texas. This analysis tries to determine the effect of weakening Florida's motorcycle helmet law.

Since July 1, 2000, Florida statutes have required motorcycle riders younger than 21 years of age to wear helmets. Adult motorcycle and moped riders are exempted provided they have insurance for motorcycle accident injuries with minimum medical benefit coverage of \$10 000.⁴ Before July 1, 2000, Florida had a helmet law that required all riders to wear safety helmets.

The State of Florida is of interest because it accounts for 9% of all motorcycle rider deaths in the United States. Coinciding with the helmet law change, the number of Florida's motorcycle registrations increased substantially. The number of motorcycle deaths

in the state was high enough to permit a monthly time series analysis. The Florida motorcycle helmet law change has not been evaluated statewide.⁵

METHODS

Data

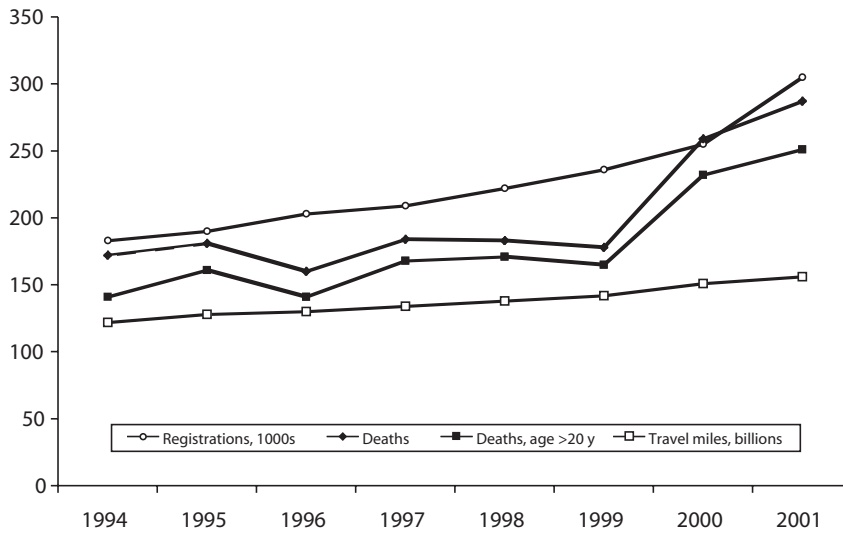
Florida's monthly motorcycle rider deaths for the period January 1994 to December 2001 were analyzed. Motorcycle rider deaths included operators or passengers of motorcycles, mopeds, minibikes, motorized three-wheelers, off-road, other, and unknown types of motorcycles. All-terrain vehicles were excluded. The definition is intentionally comprehensive to allow for comparisons over time. It matches the National Highway Traffic Safety Administration's definition of motorcycle rider death.

The time series data were obtained from the Fatal Accident Reporting System database.¹ Yearly issues of *Highway Statistics* provided motorcycle registration and travel miles for the period 1996 to 2001, and earlier years came from the 1995 summary volume.² To obtain a more realistic representation of the Florida motorcycle registration and travel trends, annual data were converted into a monthly series by 12-month centered moving averages. The smoothing operation removes 12 observations and reduces the sample size to 84 months, July 1994 to June 2001.

The following series were analyzed: motorcycle rider deaths, motorcycle rider deaths per billion travel miles, and motorcycle rider deaths per 10 000 registered motorcycles. Restricting the analysis to rider deaths of adult motorcyclists (>20 years) generates 3 additional series.

Time Series Models

The method of analysis was interrupted time series analysis using Box–Jenkins models.^{6,7} To approximate normal distributions closely, all time series were converted into natural log units. A step function for an abrupt, permanent impact models Florida's motorcycle helmet law change beginning in July 2000. The residuals of all time series follow random process properties (data available from the author upon request).



Source: Fatality Analysis Reporting System¹ and Federal Highway Administration.²

FIGURE 1—Florida motorcycle registrations, motorcycle rider deaths, and travel miles for all motor vehicles, 1994 to 2001.

correct for the motorcycle registration trend may understate the law’s impact. The large increase (19.6%) in Florida motorcycle registrations in 2001 (Figure 1) suggests that changing the law may have stimulated interest in motorcycling and increased motorcycle registrations. Substantial increases in motorcycle registrations also occurred in Arkansas (47%), Louisiana (13%), and Texas (12%) the year after their helmet laws were weakened. The extent of such a law-induced effect is currently unknown. On the basis of registration and miles traveled, it is estimated that between 46 and 82 additional motorcyclists died in Florida the year after the helmet law changed.

In 2001, only 53% of Florida underage motorcyclists who died in crashes wore motorcycle helmets; for adults the figure was 39%.¹ That is, the legal age restriction is barely effective and amounts to a de facto helmet law repeal.

RESULTS

Figure 1 presents annual trends in motorcyclist deaths, motorcycle registrations, and travel miles in Florida. During the year 2000, Florida motorcyclist deaths increased by 81 (45.5%), motorcycle registrations by 19 494 (8.1%), and travel miles by 9 billion (6.3%). The upward trends in motorcycle registrations and travel miles are noteworthy.

Figure 2 presents impact estimates based on the analyses of 6 monthly time series. The estimates indicate that the change in Florida’s helmet law increased motorcycle rider deaths. The impact on all motorcycle rider deaths is strongest, 48.6%. Controlling for travel miles reduces the estimate to 38.2%, and correcting for the motorcycle registration trend reduces the estimate to only 21.3%. Restricting the analysis to adults reduces the previous estimates only slightly.

DISCUSSION

The analysis suggests that exempting adult motorcyclists from wearing helmets increased the number of motorcyclist fatalities in Florida. However, the effect of the law

change depends on which “exposure” measures are controlled. Since travel increased in Florida, the impact estimates based on the absolute number of deaths are probably overstated. Conversely, the estimates that

CONCLUSION

This study finds that the current age-restricted version of Florida’s motorcycle helmet law resulted in more motorcyclist deaths

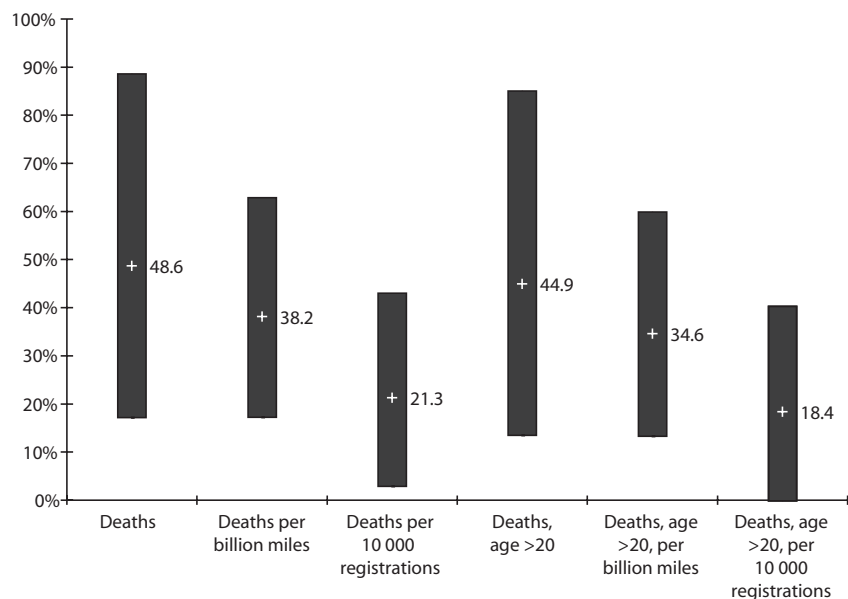


FIGURE 2—Estimated impact of the change in Florida’s motorcycle helmet law by series, with 95% confidence limits.

even after adjustment for concurrent increases in motorcycle registrations or miles traveled. Exempting adult motorcycle riders from wearing motorcycle helmets is counterproductive for motorcyclists' health and unnecessarily increases insurance and medical care expenses. ■

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This brief was accepted June 18, 2003.

Human Participation Protection

No protocol approval was needed because no individuals are identified by the analysis.

Acknowledgments

I would like to thank the anonymous reviewers for their helpful comments.

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