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State Helmet Laws and Motorcycle Rider Death Rates

Editor's Note: Motorcycles are the most dangerous form of motorized transportation. Per vehicle miles traveled, motorcyclists are about 3 times as likely as passenger car occupants to be injured in a crash, and 16 times as likely to die. Because the majority of these deaths are caused by head injury, safety advocates have recommended mandatory use of motorcycle helmets. Others contend that state laws mandating helmet use infringe on motorcyclists' rights, and question whether such laws really reduce motorcycle deaths and injury. Scientific evidence cannot address the appropriate balance between personal freedom and public safety, but it can address the effectiveness of mandatory helmet laws. This Issue Brief summarizes a new analysis of the effects of motorcycle helmet laws on death rates, and points out the need to account for other potential factors when comparing death rates across states.

20 states now require that all motorcyclists wear helmets

For more than 3 decades, public health officials and medical professionals have supported mandatory helmet use for all motorcyclists. Federal pressure in 1966, 1977, and 1991, and competing pressure from motorcyclists' groups, created cycles of state helmet law enactments and repeals. In 1975, all but three states had mandatory helmet laws; since then, many states have weakened their laws.

- Currently, 20 states and the District of Columbia require helmets for all motorcycle operators and passengers. In 27 states, only persons under a certain age (usually 18) are required to wear helmets. Three states (Colorado, Illinois, and Iowa) have no law requiring helmets.
 - Comprehensive motorcycle helmet laws are very effective in raising helmet use. Surveys show that helmet use is nearly 100% in states that require use among all riders. This compares to 34%-54% in states with no helmet laws or age-specific laws. All-rider laws are easy to enforce due to the conspicuous nature of being unhelmeted.
 - Do comprehensive helmet laws prevent deaths among motorcyclists? The National Highway Traffic Safety Administration (NHTSA) estimates that motorcycle helmets reduce the likelihood of dying in a crash by about 29%, and the risk of fatal head injury by 40%. Studies of individual states have documented sharp declines in death rates after enactment of comprehensive
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helmet laws, and corresponding increases in death rates after repeal of such laws.

- Debate still exists, however, about whether comprehensive helmet laws have actually resulted in fewer deaths and reduced injury. For example, helmet law opponents cite statistics that indicate that motorcycle fatality rates are lower in states without comprehensive helmet laws. Before reaching the conclusion that helmet laws are ineffective, however, most researchers agree that other factors, such as speeding and alcohol use, must be taken into account when making comparisons across states.

New study analyzes helmet laws and other factors that affect motorcycle rider death rates

Branas and Knudson analyzed national data from 1994-1996 to compare motorcycle rider death rates in states with and without comprehensive helmet laws. They used the Fatality Analysis Reporting System (FARS), a national database of fatal traffic crashes, and state motorcycle registrations, to calculate death rates per 10,000 registered motorcycles in each state. Then they accounted for other factors that might affect motorcycle rider death rates, such as:

- Weather, as measured by average temperature and precipitation. Weather is likely to affect rider death rates because it changes the length of the riding season in each state. States with higher temperatures and less precipitation will presumably have longer riding seasons and therefore greater opportunity for rider fatalities to occur.
- Population density, as measured by the number of state residents per square mile. Higher population density may signal driving environments with more frequent stops, as opposed to lower densities with less interrupted driving environments. Similarly, the authors accounted for the percentage of urban roads in each state. Because of lower average travel speeds and more frequent stops, the authors hypothesized that states with higher population densities and more urban roads will have fewer deaths per registered motorcycle.
- Operator and machine characteristics, such as age, alcohol use, speeding, and engine size. These factors are associated with a greater risk of motorcycle crashes and fatalities. The authors used state-level data (for example, per capita alcohol consumption and maximum speed limits per state) and information about deceased motorcyclists in each state (for example, age and motorcycle size, in cubic centimeters, or ccs) to account for state-by-state differences in these factors.

Taking all factors into account, comprehensive helmet laws are associated with lower death rates

At the time of the study, 25 states and the District of Columbia had comprehensive motorcycle helmet laws. These states were compared with the 25 other states, most of which had laws covering underage motorcyclists only. No state changed its law in the study period.

- The study confirms that from 1994-1996, states with comprehensive helmet laws had higher death rates than other states (a median of 6.2 deaths per
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10,000 registered motorcycles vs. 5.1 deaths per 10,000 registered motorcycles). Although these figures would seemingly argue against comprehensive helmet laws, several other differences across these states undermine that conclusion. Most notably, states with comprehensive helmet laws also had higher average temperatures (by more than 5 degrees), potentially changing the death rates in those states independent of helmet laws.

- When the authors analyzed the independent effect of weather, they found that it played a significant role in state-level motorcycle death rates. The riding season in states with higher temperatures is presumably longer than in states with lower temperatures, providing a greater opportunity for motorcycle rider deaths to occur. Because states with comprehensive laws also had higher average temperatures, their death rates may have been disproportionately affected by longer riding seasons.
- When the authors statistically adjusted for all factors, death rates in states with full helmet laws were lower than states without such laws, although not significantly so. In other words, once other intervening factors were taken into consideration, states without comprehensive helmet laws no longer had lower death rates.

Recent increase in motorcycle rider fatalities is cause for concern

Since this study was conducted, NHTSA has documented increases in motorcycle rider fatalities nationally, after a steady decrease in the past two decades.

- Motorcycle rider deaths reached an all-time high of 5,144 in 1980, decreased to 3,244 in 1990, and reached an all-time low of 2,116 in 1997. In 1998 and 1999, this trend was reversed with increases to 2,294 in 1998 (8.4%) and to 2,472 (7.8%) in 1999. Preliminary data for 2000 indicate that the increases continue, with an estimated 2,680 fatalities. Motorcycle rider fatality rates, per registered motorcycle, have increased as well.
- Since the study, five states weakened their motorcycle helmet laws to apply only to younger riders: Texas and Arkansas in 1997, Kentucky in 1998, Louisiana in 1999, and Florida in 2000. According to NHTSA, in the first full year after weakening their helmet laws, helmet use fell from 97% to 55% in Arkansas, and from 97% to 62% in Texas. At the same time, fatalities among motorcyclists increased by 21% in Arkansas and 31% in Texas.

POLICY IMPLICATIONS

This study weakens the claim that fatality rates are lower in states without comprehensive motorcycle helmet laws. Statistical adjustment for other factors associated with fatality rates is critical to understanding these issues.

- Although data from motorcycle rider death rates might seem persuasive, legislators should be wary of claims using simple, unadjusted death rates as they consider changes to their existing motorcycle helmet laws.

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POLICY IMPLICATIONS

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- Longer-term studies are needed to fully assess the effects of enacting, weakening or repealing state motorcycle helmet laws. A 25-year (1975-1999) expansion of the current study is underway in order to gauge the long-term effects of changes in state helmet laws.
- Legislators, policymakers, and the motorcycling community should focus efforts and resources to reverse the recent upward trend in motorcycle deaths. A good starting point is NHTSA's draft Motorcycle Safety Improvement Plan, released in June 2001. The Plan emphasizes preventing crashes by increasing the effectiveness of operator licensing systems, supporting rider education, decreasing rider impairment, and improving motorist awareness. It also includes strategies to mitigate crash injury by promoting the use of helmets that meet federal safety requirements and other protective gear.

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