

## Motorcycle Injuries In Rhode Island

*Edward F. Donnelly, RN, MPH*

**Deaths of motorcyclists due to traffic crashes increased in the United States in each of the ten years 1998-2007.** The annual number of deaths more than doubled, from 2,116 in 1997 to 5,154 in 2007.<sup>1</sup> This period of increased motorcycle mortality followed a period from 1980 to 1997 during which such deaths had declined steadily.

Overall, the number of motor vehicle traffic fatalities has held steady at just over 40,000 deaths per year nationally, since 1990.<sup>2</sup> Because the number of motor vehicle traffic deaths varied little in these years, motorcyclists' deaths increased steadily and dramatically as a proportion of the total traffic deaths; from 5% in 1997 to 12.6% in 2007. The age-adjusted population rate of mortality for motorcyclists as a part of motor-vehicle traffic mortality increased 62% in the 5 years from 1999 to 2004.<sup>3</sup>

### METHOD

#### Mortality

Traffic death counts are drawn from the **Fatality Analysis Reporting System (FARS)**, a program of the **National Highway Traffic Safety Administration (NHTSA)** which lists motor vehicle traffic fatalities in the United States according to a strict case definition, with much detail about crashes, vehicles, and persons. The Rhode Island Department of Transportation collects data for FARS from police, medical examiner, and hospital records. FARS produces standard reports and data are available to all for analysis.

Rhode Island motorcycle mortality was obtained from FARS reports. The small number of motorcycle deaths reported annually in Rhode Island makes analysis difficult. An alternate approach to assess injuries is to use morbidity data. Hospital discharge data provide a case series with sufficient events for analysis during the same time period as the national findings. Hospital admission serves as a lower limit for the severity of the injury required to be included as a case.

#### Morbidity

The eleven acute care hospitals submit person-level records for each discharge in accordance with regulations developed under licensure statutes. Discharge records include dates, charges, demographics, and clinical variables with up to twenty-five diagnostic codes, based on the **International Classification of Diseases, Ninth revision, clinical modification (ICD-9-CM)**.<sup>4,5</sup>

Identified cases include an external cause of injury code (Ecode) that indicates the cause of injury as motor vehicle traffic (ICD-9-cm E810–E819) with a fifth character of 2, indicating that the

person was a motorcycle operator or 3, indicating a motorcycle passenger. Only those cases with a date of admission in the stated years are included in the analysis. Hospitalizations are reported at the time of discharge but cases are chosen for this analysis by the date of admission, placing the event in the correct year. Misclassification due to omission of Ecode, using a less specific Ecode, or miscoding is a threat to completeness.

### RESULTS

#### Mortality

In the ten-year period 1998-2007, 108 motorcyclists in Rhode Island died in traffic crashes, just under eleven per year. Mortality rates for motor vehicle traffic crashes in Rhode Island are lower than those found in the United States as a whole, but the annual number of deaths showed an increasing trend similar to that seen nationally.

#### Morbidity

During 1997-2007, 1,263 motorcyclists were identified among those who were admitted to Rhode Island hospitals, over one hundred per year. Hospital admissions for motorcycle injuries have more than doubled from 71 in 1997 to 169 in 2007. Motorcycle injuries as a percentage of all admissions due to motor vehicle traffic injuries also followed an upward trend (Figure 1) against a background of traffic injury admissions that varied about a mean of 929 admissions per year, ranging from 843 to 984.

Males (89.7%) predominated among those admitted for motorcycle crash injuries, as did Whites (88.7%). Other race categories and persons of Hispanic origin are under-represented. Males are a slightly larger majority (93.7%) when attention is limited to operators. Operators of motorcycles make up the overwhelming majority of the motorcyclists admitted (92.4%). An annual average of fewer than seven motorcycle

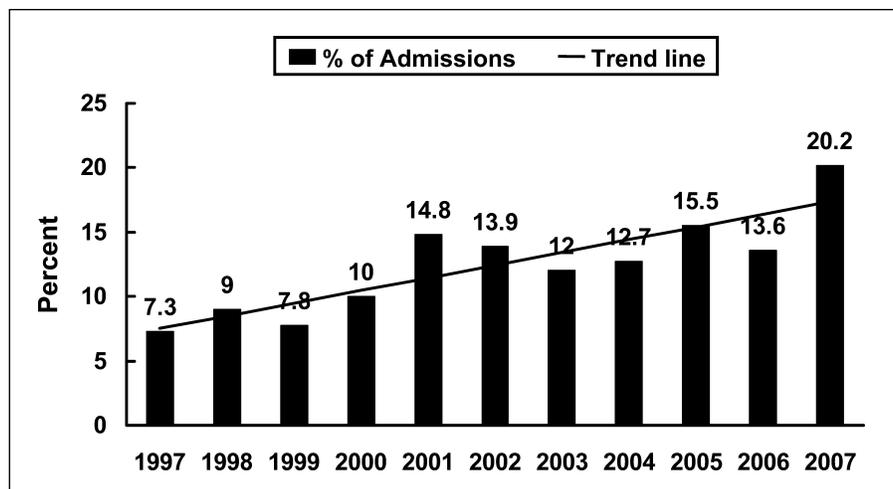


Figure 1. Motorcyclists as a percentage of motor vehicle traffic injury admissions, by year, Rhode Island 1998-2007

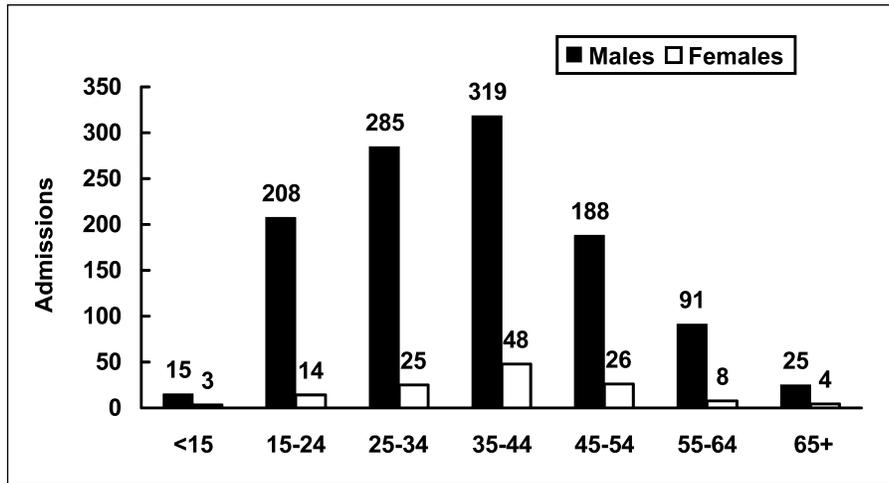


Figure 2. Number of motorcycle injury admissions by sex by age group, Rhode Island 1997-2007

passengers were admitted. Passengers in the in-patient records are more likely to be female (76.4%).

Motorcycle injury hospitalizations peak in the age group 35-44 years for males and females. (Figure 2) Over half of admitted males (53.4%) are between the ages of 25 and 44, inclusive. In Rhode Island the mean age of motorcyclists admitted with crash injuries increased from 34.2 years to 38.7 years during 1997-2007. An aspect of this age increase was an increase in the proportion of admissions who were 45 years of age or older, from 19.5% in 1998 to 32.1% in 2007.

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## DISCUSSION

The increase in motorcycle traffic deaths that has occurred nationally is also seen in Rhode Island despite a small population and limited motorcycle season. The increase occurred while the number of deaths in occupants of passenger cars and light trucks steadily declined. This mortality is the most severe outcome of serious injuries, a larger number of which result in hospital admissions. Motorcycle injury admissions were highest among adult males 25-44 years of age, a different distribution than that found generally in motor vehicle crashes, where numbers peak among 15-24 year olds and decrease sharply in subsequent age groups.

sequent age groups.

Explanations for the increasing numbers of injuries include: 1) the aging of motorcyclists may make them more vulnerable to serious injury and death. In addition, those aging motorcyclists may be driving bigger bikes than the ones they learned on; 2) more are on the road, and the estimates of miles traveled have increased. This constitutes an increase in exposure; 3) motorcycle operators over age twenty-one are not required to wear helmets in Rhode Island after the first year of licensure; many do not.

Ironically, other vehicle travel had also increased through 2007, but with an accompanying decrease in mortality and hospital admissions for occupants of those vehicles.

Public health prevention efforts include support for educational and legislative efforts to increase helmet use. Primary care providers have opportunities to identify motorcyclists among their patients and to encourage safe riding.

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## Disclosure of Financial Interest

The author has no financial interest to disclose.