# Risky Motorcyclist Behavior Correlates with Small Motorcycle Engine Size

**R. Jonathan Robitsek, Richard Tom, Simon P. Tiu, Taylor R. Klein, Marianne J. Mylan, Sebastian D. Schubl, Vanessa P. Ho**

*Department of Surgery, Jamaica Hospital Medical Center, Jamaica, NY*

## Background

- Motorcycles have the greatest crash costs per person-mile of all vehicles in the US (Miller, 1993)
- In 2010, motorcycles made up 3% of all registered vehicles in the US, and accounted for 0.6% of all vehicle miles traveled (NHTSA, 2010)
- From 2001-2010, US motorcyclist fatalities increased by 41% (NHTSA, 2010)
- Per vehicle mile traveled, motorcyclists are ~30 times more likely to perish and 5 times more likely to be injured than drivers or passengers in caged vehicles (NHTSA, 2010).
- Across all classes of motorcycles, there has been a trend towards an increase in the average size of engines in fatal motorcycle crashes, *suggesting that larger engine motorcycles are inherently riskier to ride than those with smaller engines.*
- *"You are what you drive":* Motorcycle size and engine type may reflect the riding style and attitude of the rider
- Rider style and attitudes towards risk taking may be an important causative factor contributing to the higher injury and fatality statistics observed for larger engine size motorcycles, rather than the large engine of the motorcycle itself (Houston, 2011)

## Hypothesis

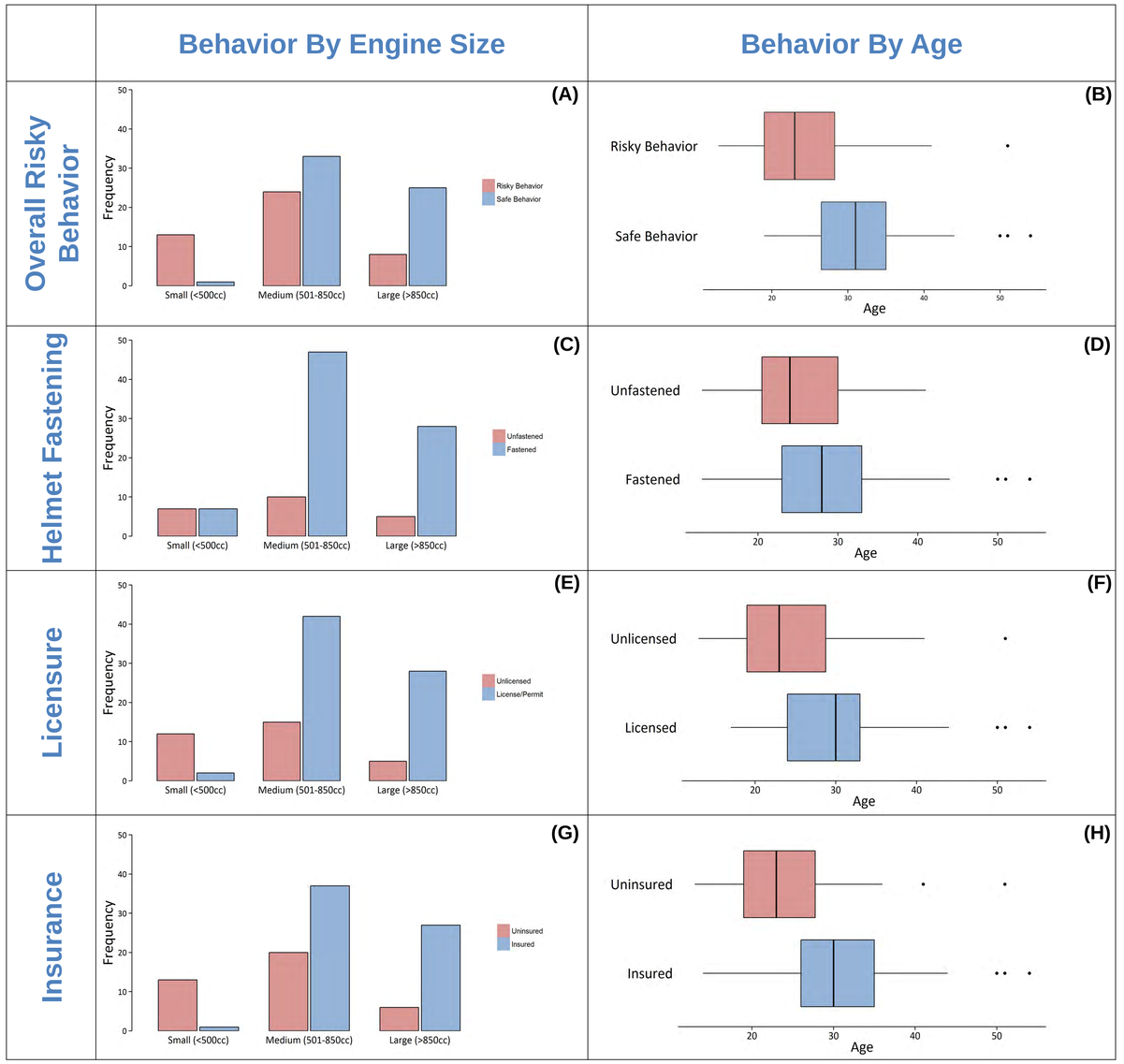
*Riders of MCs with larger engines are more likely to exhibit risky behavior than riders of MCs with smaller engines.*

## Methods

- Retrospective analysis of adult inpatients after MC accident from 4/2002 to 3/2007
- Demographics, helmet fastening, MC licensure, and MC insurance were collected from charts and/or prospective patient interviews.
- ES were categorized as: small (<500cc), medium (500-850cc), large (>850cc), or unknown.
- Risky behavior : A failure to fasten or wear a helmet, or operating a motorcycle without a license or without insurance.
- Univariate analysis was performed to determine factors associated with risky behavior (chi-square and t test); multivariable logistic regression was performed.

## Results

- 190 motorcyclists admitted between 4/2002-3/2007
- 115 (61%) had complete safety profile, collected during admission
  - 108 Male (94%)
  - Mean age 28 ± 8.1 years
  - 59 (51%) showed safe behavior
  - 56 (49%) showed risky behavior
- Risky riders were significantly younger than safe riders (***B***; $p < 0.001$), and more likely to be riding small engine motorcycles (***A***; $p < 0.001$).
  - Age ($OR = 0.87$, $p < 0.001$) and small engine size ($OR = 10.75$, $p = 0.03$) were independently predictive of risky behavior.
- Medium ($OR = 4.7$; $p = 0.02$) and large (OR = 5.6; $p = .02$) engine MC riders were more likely to fasten their helmet than riders of small engine MCs (***C***). Riders with unfastened helmets were younger than fastened riders (***D***; $p = 0.04$).
- Medium ($OR = 16.8$; $p < 0.001$) and large (OR = 33.6; $p < 0.001$) engine MC riders were more likely to be properly licensed than riders of small engine MCs (***E***). Riders without proper licensure were younger than licensed riders (***F***; $p < 0.001$).
- Medium ($OR = 24.05$; $p = 0.003$) and large (OR = 58.5; $p < 0.001$) engine MC riders were more likely to be properly insured than riders of small engine MCs (***G***). Riders without proper licensure were younger than licensed riders (***H***; $p < 0.001$).
- Length of stay was 56% longer for risky riders than safe riders ($OR = 1.59$; $p < 0.001$).




## Discussion

- Within our sample:
  - Small motorcycle engine size was significantly and independently associated with risky behavior
  - Younger age was significantly and independently associated with risky behavior
  - Hospital length of stay was significantly longer for risky riders as compared to safe riders.
- Riders of motorcycles with larger engines may attempt to mitigate risk by practicing safe behaviors
- Limitations include small sample size and potential selection bias as some patients were not or could not be interviewed
- Injury prevention providers should emphasize safe riding practices amongst young motorcyclists and those with all sizes of engines
- Future research should study whether community and in-hospital interventions can modify rider behavior

## References

(1) Miller, T. (1993). Costs and functional consequences of United States roadway crashes. *Accident analysis and Prevention*, 593:607.

(2) National Highway Traffic Safety Administration. (2010). *Traffic Safety Facts*: *Motorcycles*. DOT HS 811 639. Washington, D.C.: US Department of Transportation.

(3) Houston, D.J. (2011). Motorcyclists. In B.E. Porter (Ed.) *Handbook of Traffic Psychology* (pp. 375-387). Academic Press.