

Characteristics of Motorcycle Crashes in the U.S.

Jeya Padmanaban M.S.

Vitaly Eyges PhD

4th IRTAD CONFERENCE

***Road safety data: collection and analysis
for target setting and monitoring performances and progress***

Seoul, 16-17 September 2009

Background

- Over the past 10 years (1997-2007), the U.S. has seen significant:
 - Increases in motorcycle use,
 - Changes in motorcycle driver demographics and engine sizes, and
 - **Increases in fatal injury rates for motorcycle riders.**
- In 2007, 5,154 motorcyclists died in vehicle crashes, **an increase of 144%** over the 2,116 motorcycle fatalities just 10 years earlier.

Study Objectives

- Identify factors:

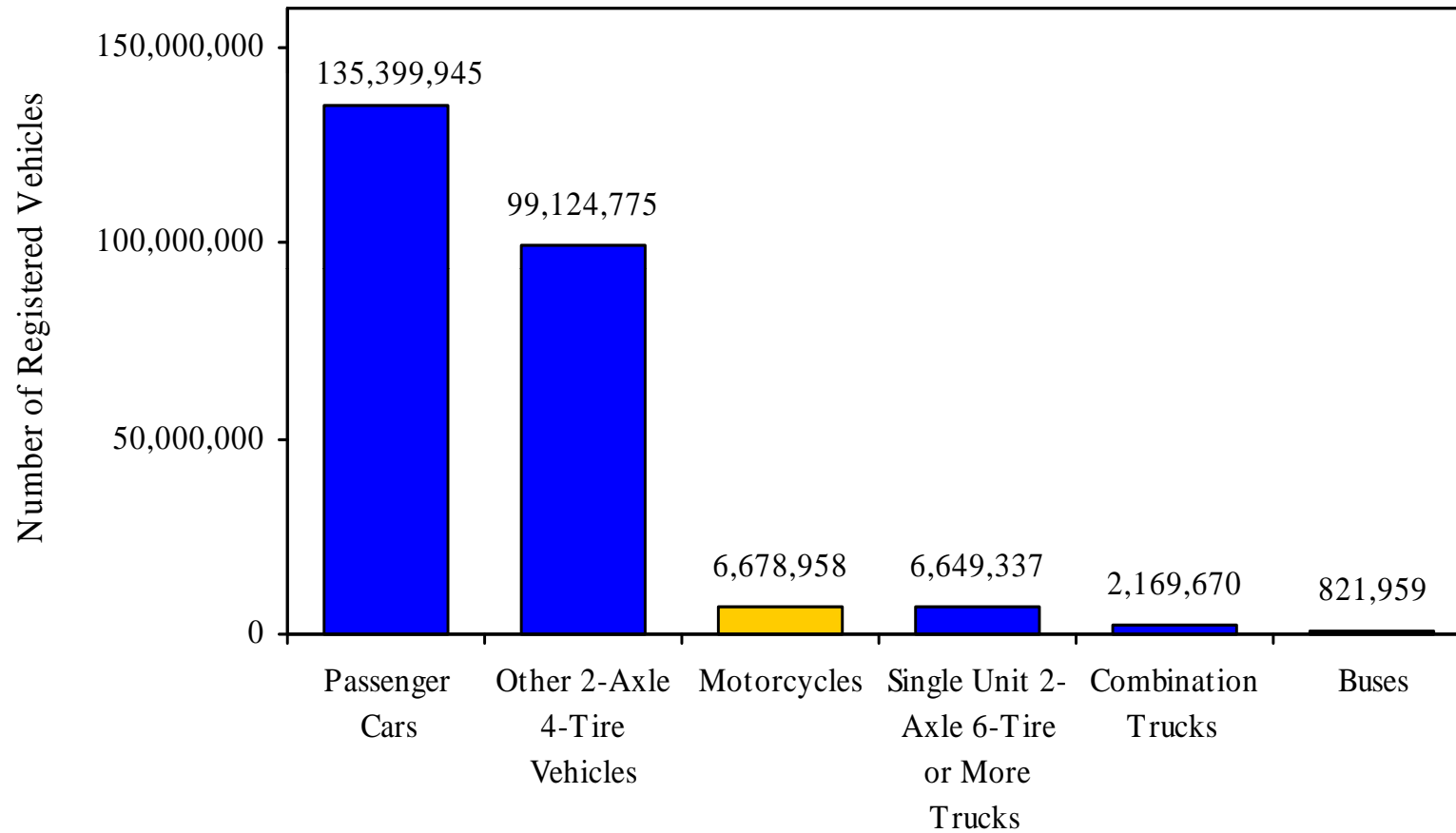
- **Accident**
- **Vehicle**
- **Rider**
- **Environmental**

associated with motorcyclist (rider and passenger) injury and fatality in U.S. crashes.

Data Sources

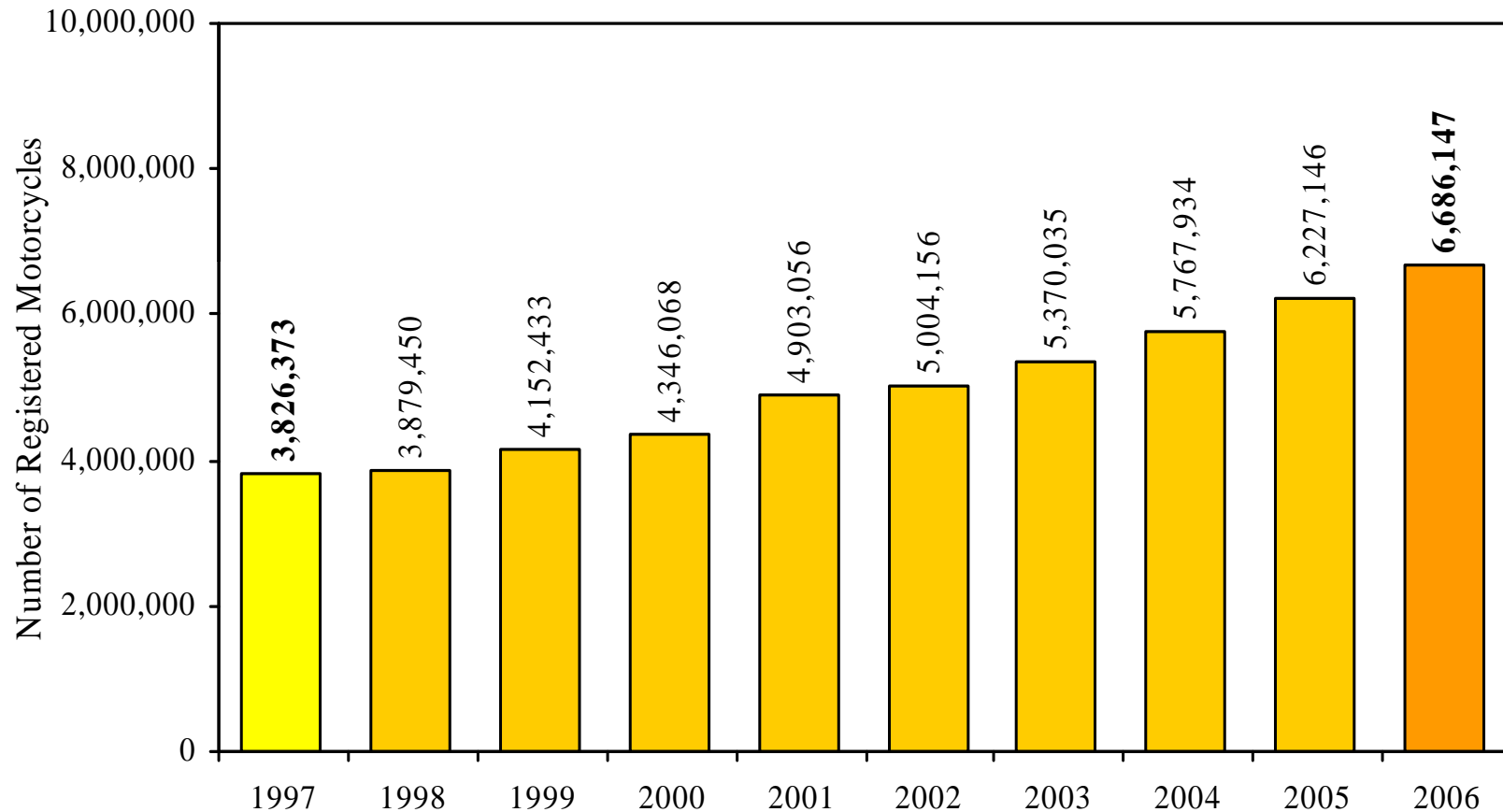
- ❑ Fatal crash data
 - **FARS (1990-2007)**
- ❑ Injury and crash data
 - **NASS/GES (1990-2007)**
- ❑ U.S. motorcycle registration data
 - **R.L. Polk & Co.**
- ❑ Miles travelled
 - **FHWA** estimates and **State surveys**
- ❑ Consumer complaints
 - **NHTSA's Office of Defects Investigation**

Vehicle Population by Type of Registered Vehicle (2006)



Source: U.S. Department of Transportation, Federal Highway Administration (FHWA).

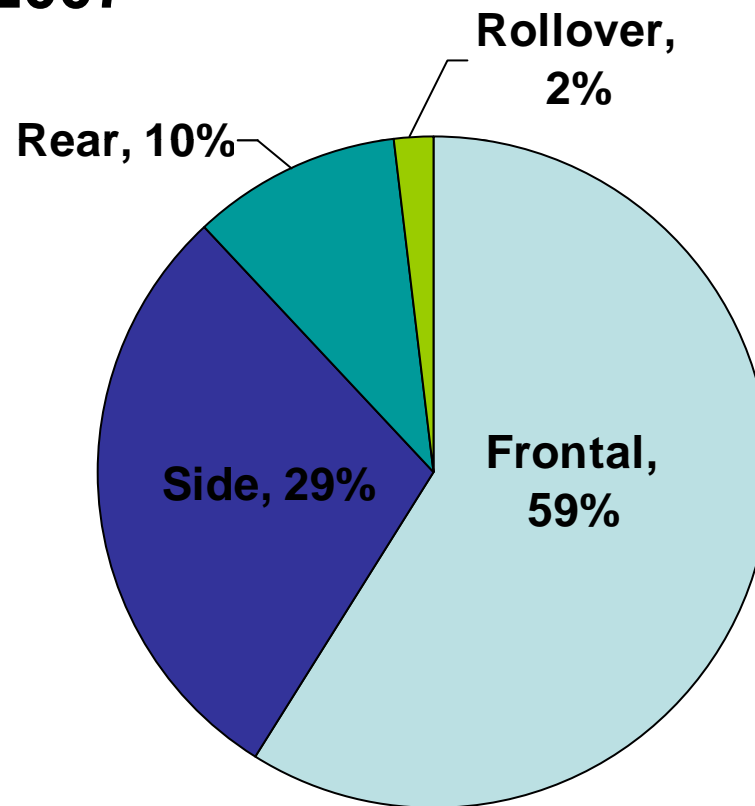
Number of Registered Motorcycles by Year



Source: National Highway Traffic Safety Administration (NHTSA), *Traffic Safety Facts - Motorcycles*, 2007.

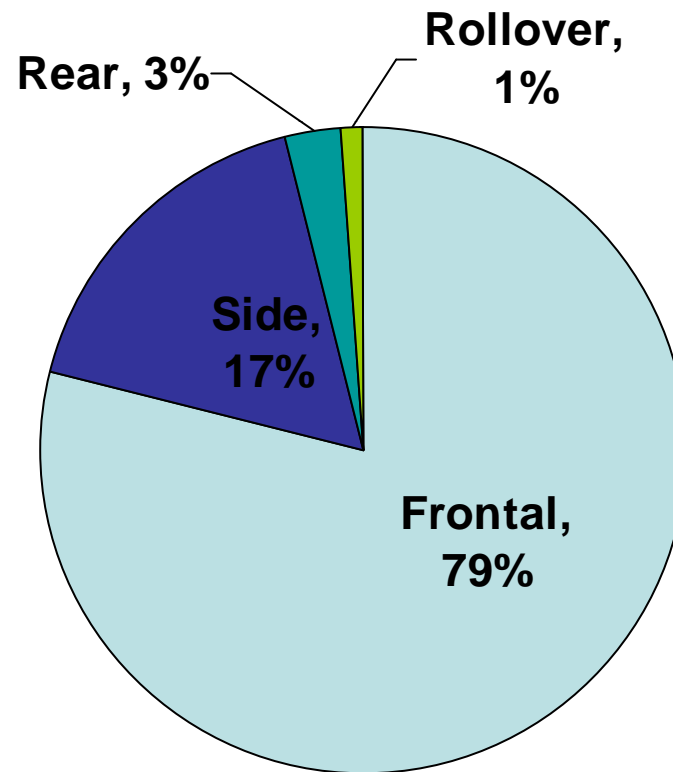
Distribution of Crashes by Type (NASS/GES)

- There were about 42,000 motorcycle crashes/year in 1990-2007



Distribution of Fatal Crashes by Type (FARS)

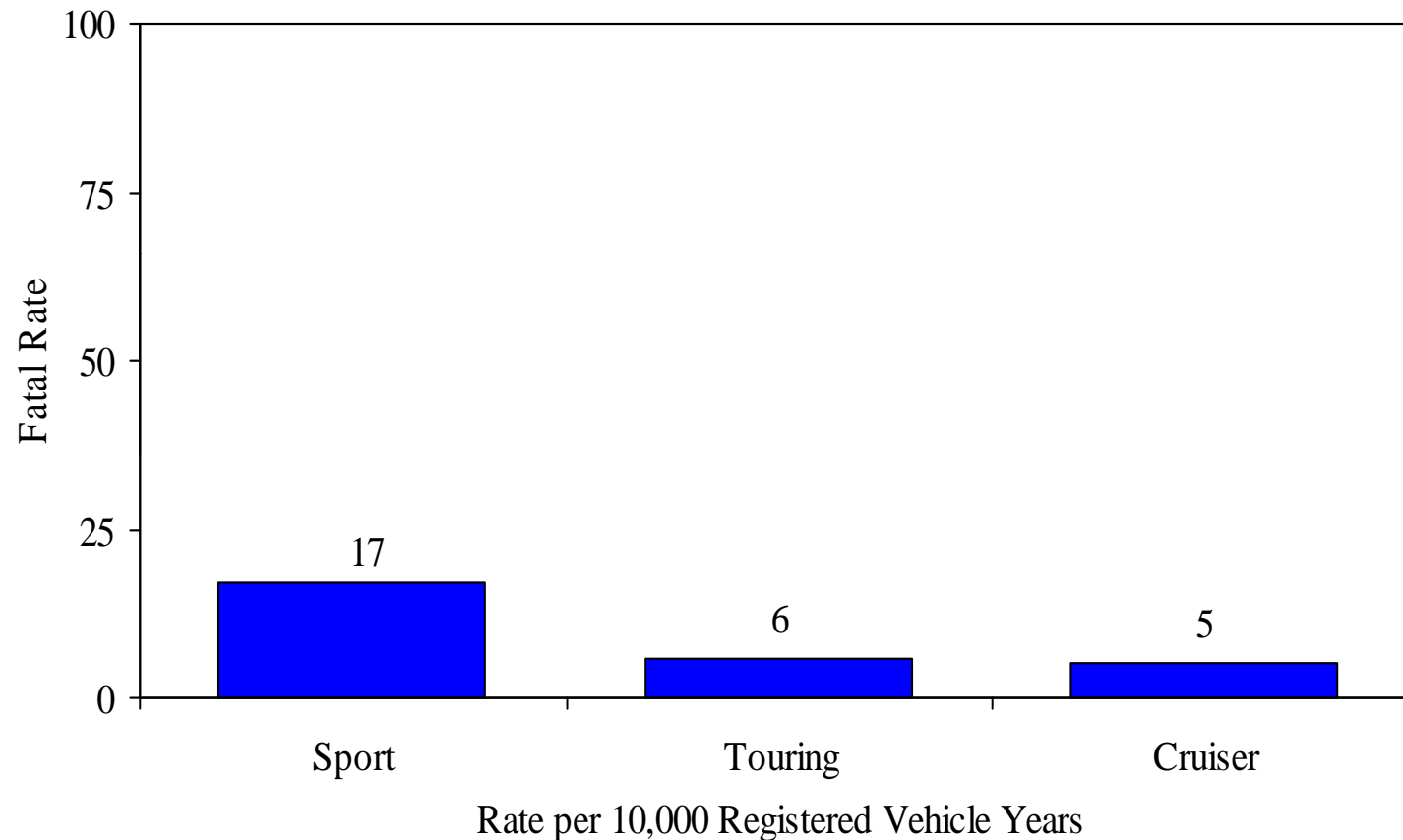
- There were about 4,000 *fatal* crashes/year in 2000-2007



Fatal Crash Locations

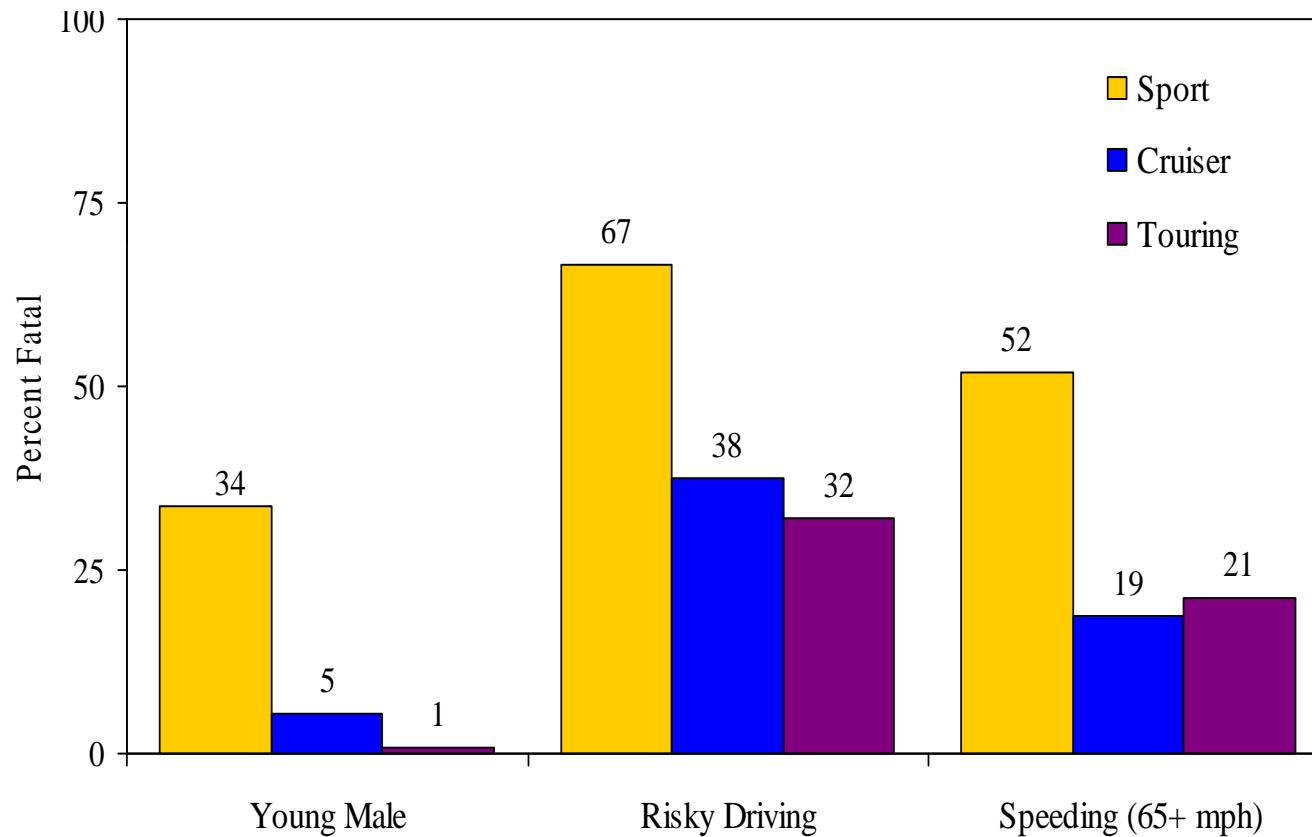
- About 30% of all fatal motorcycle crashes occurred on grade/hill roadways.
 - Trend seems to be towards an increasing percentage of motorcycle fatalities occurring on **rural** roads:
 - ~ **50.3% on rural roads in 2001-2007** vs.
 - ~ **44.7% on rural roads in 1990-1995**

Fatal Rate per 10,000 Registered Motorcycles (FARS)



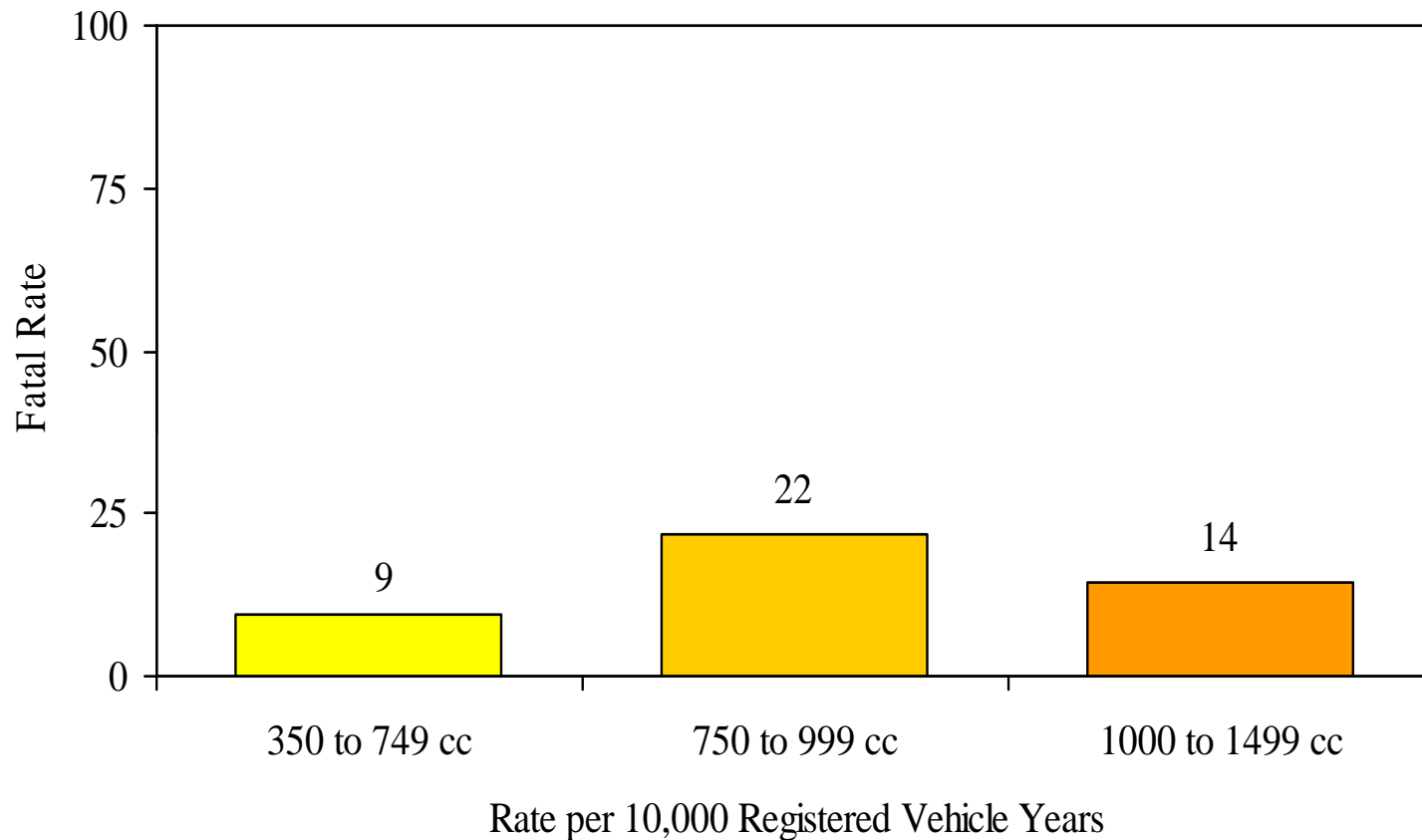
Source: Fatality Analysis Reporting System (FARS) 2000-2007.

Factors Associated with Fatal Crashes, by Motorcycle Type (FARS)



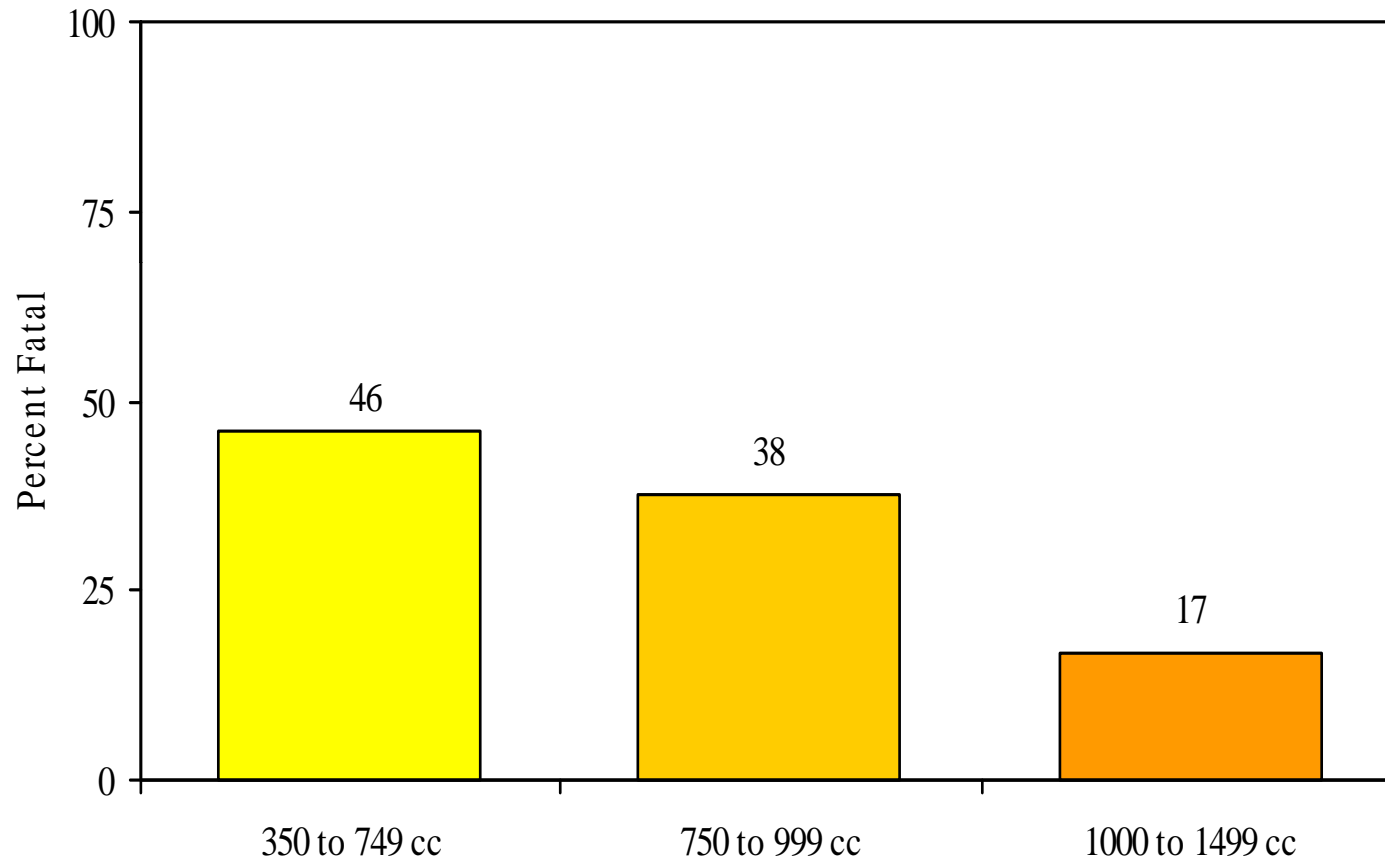
Source: Fatality Analysis Reporting System (FARS) 2000-2007.

Fatal Rates per 10,000 Registered Motorcycles, Sport Motorcycles, by Engine Size (FARS)



Source: Fatality Analysis Reporting System (FARS) 2000-2007.

Percent of Young Male Riders in Fatal Crashes, Sport Motorcycles, by Engine Size (FARS)



Source: Fatality Analysis Reporting System (FARS) 2000-2007.

“Run Off Road” Crashes

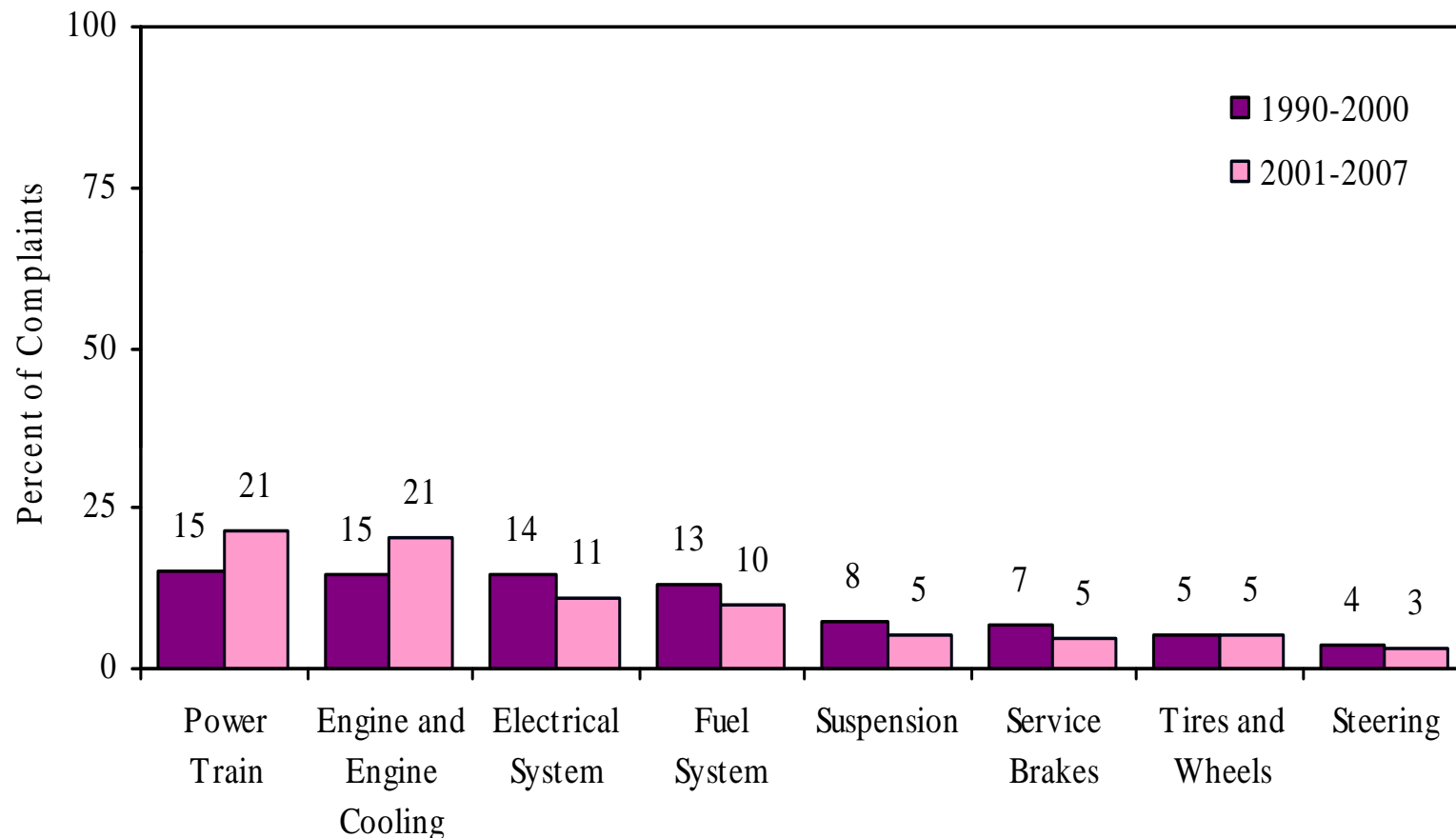
- FARS data (2004-2007) shows “run off road” crashes account for:
 - ~ **40% of all fatal crashes**
 - ~ **80% of all *single-vehicle* fatal crashes**

- This type of crash is associated with:
 - **Young male riders**
 - **Night/dark hours (8 P.M.-8 A.M.)**
 - **Higher speeds (55 mph or greater)**

Helmet Use and Alcohol

- ❑ An un helmeted rider is 40% more likely to sustain a fatal head injury than a helmeted rider.
- ❑ The effectiveness of helmet is 67% in reducing brain injuries.
- ❑ A study of 3,600 motorcycle crashes shows that helmet use is the most **SIGINIFICANT** factor influencing survival.
- ❑ 44% of fatal riders were not using helmets; about 30% were alcohol impaired.

Percent of ODI Complaints for Motorcycles, by Component Type



Source: Office of Defects Investigation (ODI), 1990-2007.

U.S. Crash Findings

- ❑ Sport motorcycles have a fatal rate that is **3 times higher** than the corresponding rates for Cruisers or Touring bikes.
- ❑ The primary factors influencing motorcycle rider fatality are lack of **helmet use, speeding, alcohol use, and rider age.**
- ❑ Fatal crashes for Sport motorcycles are associated with **young riders and risky driving behaviour**, including speeding.

Other JP Research Studies

- ❑ Research on motorcycle crashes in other countries is also ongoing, including accident reconstruction and data collection efforts in India.
- ❑ In a recent fatal crash, two motorcyclists died due to **head injuries** after underriding the rear of a truck that had broken down on the shoulder in the dark. The most evident damage to the bike was severely bent handlebars.



Common Safety Issues

- ❑ Many safety issues in this case differ from those found significant in the U.S. study:

- Paved shoulders are often used as motorcycle lanes.
- No space to pull off safely.
- Truck had no reflectors.

- ❑ *Common issues* include:

- Road was DARK
- Cyclists were YOUNG MALES
- Neither wore a HELMET.



Motorcycle path of travel