



# Motorcycle Crash Causes and Outcomes: Pilot Study

## Background

The number of motorcyclist crash-related fatalities has more than doubled during the past 10 years. In the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)*, Congress directed the Secretary of Transportation to conduct a comprehensive study of the causes of motorcycle crashes. In anticipation of this mandate, the National Highway Traffic Safety Administration awarded a contract to Westat, Inc., and Dynamic Science, Inc., to conduct a Pilot Study to develop and test a methodology for in-depth motorcycle crash investigation. Using a protocol developed by the Organisation for Economic Cooperation and Development for a multinational European study as a guide, the project had four main goals:

- Develop comprehensive data collection forms, a coding manual, and field protocol for crash investigations;
- Develop data collection forms, a coding manual, and field protocol for the collection of control group data;
- Develop training material for use in a future larger scale study; and
- Assess the levels of effort and resources required for each stage of an investigation.

## Method

To test the methodology, a research team of three crash investigators and one supervisor investigated motorcycle-related crashes in Orange County, California. Agreements were negotiated with police agencies to provide the team with immediate notification of focal crashes and with access to crash-related data, preferably while such data were relatively undisturbed, immediately following the crash. At least one investigator was “on call” so that crash investigations could be initiated “on-scene,” 24 hours per day, 7 days per week. The investigators responded to crash cases at the scene immediately after notification that the crash occurred, when such notifications were timely. Cases were initiated from December 8, 2008, through March 8, 2009.

Using the prescribed Crash Scene Data Collection protocols, the crash investigator collected environmental, highway-related, and crash-related evidence while at the scene of the crash whenever possible, in order to describe the crash scene in detail for both the rider and the operators of other vehicles. The investigator at the scene also inspected and

photographed the involved motorcycle (and other vehicles, if appropriate and available). Complete vehicle inspections could not be accomplished at the crash scene, so the investigators tracked the vehicles to tow yards, impound facilities, or other locations to finish the documentation.

Interviews were conducted at the scene with police officers, the motorcycle riders and passengers, and other vehicle occupants whenever possible. In cases in which riders, passengers, or vehicle occupants were severely injured or suspected of criminal activity, interviews were held at the hospital, at home, or as follow-up telephone correspondence. Interviewees who were available on-scene were given voluntary breath tests for blood alcohol concentrations. For injured parties, blood alcohol information was obtained from medical reports or police crash reports when possible. The investigators compiled a list of occupant injuries from interviews, medical records, and autopsy reports.

The study plan also required the collection of comparison data from non-crash-involved motorcyclists. Two control cases were to be selected for each investigated crash. The control cases included interviews with motorcyclists and passengers and a detailed inspection of the motorcycle. Breath samples for alcohol detection were also requested from control motorcycle riders. The control data were intended to be collected either one week post-crash at the crash location at the same time of day and day of week for traffic traveling in the same direction, or immediately following the clearance of the crash scene. Alternatively, control cases were obtained from nearby locations such as gas stations when safety concerns precluded data collection at the crash site.

## Results

### *Crashes Investigated and Control Data*

Fifty-three crash cases were initiated during the three-month study period. Of these crash cases, 23 cases were completed, 20 were dropped due to non-injury or lack of cooperation, and 10 could not be completed during the investigation period.

The collection of case control data was a difficult task. Several approaches were used and were met with limited success. Investigators set up signage that advertised free gas to motorcyclists who stopped and participated in interviews and vehicle inspections. However, from the 24 crashes for

which control data collection was attempted, successful in-person motorcycle stops occurred at 6 crash sites, with 10 persons interviewed. The investigators also attempted to take video or digital photographs of motorcyclists who passed by but did not stop. Some data elements could be collected from these images, which captured an additional 56 vehicles.

#### *Time and Cost to Collect Data*

The team responded to 45 crash notifications from cooperating police agencies. When police notifications were timely, they were received on average in 14.4 minutes. The interval from time of crash to time of notification ranged from immediate notification to more than 11 days, resulting in an average notification time of 1.6 days. Interviews with involved riders and drivers of other vehicles were obtained on average in less than 24 hours.

Team members left home or office within minutes of receiving a crash notification. The crash sites ranged from a 15 minute to a 90-minute trip for the investigators. The average team response time was 7.5 minutes when police notifications were prompt.

There were 13 cases for which medical data were requested and received by the end of the data collection period. The average length of time for receipt of medical records following the submission of a signed patient release form was 17.6 days. Autopsy reports are public records in California, and those were available as soon as they were completed. Medical records were pending for 7 cases at the end of the pilot study. The team reported excellent cooperation from the hospitals and the medical examiner's office.

The average number of hours to complete a crash investigation including collecting control data and allowing a margin for dropped cases was about 60 hours, resulting in an average cost per completed case of about \$7,500. It is important to note that this cost does not include the cost of developing data collection forms, a coding manual, training materials, databases, or field protocol. It also does not include the cost of equipment, hiring and training data collectors, or helmet testing.

## **Recommendations**

One of the primary goals of the Pilot Study was to evaluate the data collection instruments and methodology prior to the initiation of a larger scale study. Some of the recommendations to improve the methodology included:

- Minor changes to the data forms and coding manual;
- Assigning one person for all control data collection to eliminate potential conflicts with crash responses;
- Including investigator narrative in description of crash causation; and
- Formal training in anatomy and injury coding for crash investigators.

## **How to Order**

To order *Motorcycle Crash Causes and Outcomes: A Pilot Study*, prepared by Westat, Inc., and Dynamic Science, Inc., write to the Office of Behavioral Research, NHTSA, NTI-130, 1200 New Jersey Avenue SE, Washington, DC, 20590, fax 202-366-7394, or download from [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov). Paul Tremont, Ph.D., Jenny Percer, Ph.D., and Jessica Cicchino, Ph.D. were the Contracting Officer's Technical Representatives for this project.



U.S. Department of Transportation  
**National Highway Traffic Safety  
Administration**

1200 New Jersey Avenue SE., NTI-130  
Washington, DC 20590

*TRAFFIC TECH* is a publication to disseminate information about traffic safety programs, including evaluations, innovative programs, and new publications. Feel free to copy it as you wish. If you would like to receive a copy, contact Dr. Angela Eichelberger, Editor, fax 202-366-7394, e-mail: [angela.eichelberger@dot.gov](mailto:angela.eichelberger@dot.gov).